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THE FAILURE OF THE SILVER CONFERENCE AND OUR FUTURE POLICY.

The International Silver Conference has adjourned without doing anything; in fact, it was a forgone conclusion that it would do nothing, for no comprehensive or well defined plan was presented to it and our case was discredited from the outset by having as one of our representatives Senator JOHN P. JONES, the head of the infamous Comstock mill ring. Even though their politeness prevented the foreign members of the conference from openly resenting the insult placed upon them, as well as on the American people, by the appointment of JONES, yet it was inevitable that every suggestion we made would be looked upon with suspicion as a trick or scheme for promoting the personal interests and fortunes of the unscrupulous ring which had power to have its chief appointed on the commission. The ENGINEERING AND MINING JOURNAL pointed this out when it was first intimated that Senator Jones might be appointed and the result has fully justified this warning and protest.

The question which we raised of a universal currency and the use of both gold and silver upon a flexible and permanent basis, under which there can be little loss to any nation and none to the individual, as such, is still open, and will, we believe, receive greater attention as its aims and advantages are investigated. It has already received the warm support and approval of the very highest financial authorities in New York and Washington, the presidents of banks, the manager of the New York Clearing House, and others, while the ardent silver men of the West equally approve it. In fact, its advantages go very far indeed beyond the mere steadying the price of silver, that being but one of its aims. We shall be very pleased indeed to have it discussed and criticised by anyone who will give it careful thought, and who will then point out any inherent difficulties to its adoption.

The policy of the United States should now be to abandon the stupid role of suppliant to European nations and make them come to us. The Sherman silver bill should at once be repealed, the purchase of silver stopped, and, in its place, the Government should buy each month, say \$5,000,000 of gold, in just the same manner as it now buys silver. It will not then require many months to convince Europe that this country can take care of itself. When they desire to adopt some policy satisfactory to us, we can offer some such plan as that of an international monetary clearing-house, which will benefit the whole world and hurt no one.

THE PLAN OF THE INSTITUTE OF MINING ENGINEERS.

Having recently received from the founders of a new association of mining engineers, in a distant country, a request for particulars of the plan of the Institute, which, in view of its signally successful results, they proposed to copy, and having replied at some length to this inquiry, I am led to believe that the substance of a portion of this reply may be interesting to American readers also; and, in this belief, I submit the following observations:

1. The success of the Institute is, in my judgment, largely due to two features of its organization, namely: (1), the absence of professional qualifications as requirements of membership; and (2), the absolute control of all its affairs by an elected Council, the acts of which are not subject to review, approval or disapproval, by the body of the membership, except so far as the election of new members is concerned. These two things go together and one necessitates the other.

2. As to the first, one must confess that it sacrifices certain advantages, possessed by more select societies, such as the Institution of Civil Engineers of Great Britain and the American Society of Civil Engineers, membership in which presents a certain guaranty of professional standing and experience, and is an honor to besought. On the other hand, our plan presents certain advantages. It is not necessary to compare the two systems, and decide which is the better on the whole. I am not willing to disparage in any way the "select" plan. It is sufficient to say that the Institute does not pretend to follow that principle, and is, in fact, more like the British or the American Association for the Advancement of Science—namely, a voluntary association comprising all who desire to assist its purposes and receive its publications. We require no designated amount of professional education or practice. The only requisite for membership is practical connection, direct or indirect, with mining or metallurgy, and our Associates need not have any connection with either. Students not yet graduated are admitted as Associates, but made Members, without question, upon their own request, when they have got into actual practice. The rights and obligations of Members and Associates are in all respects alike. Both classes can vote, hold office, write papers, etc., and the dues are the same for both. In fact, the distinction is never felt. We merely require the indorsement by three Members or Associates of a proposal for membership, in order to have some assurance of the good faith and the respectability of the candidate, and (if he is proposed for member) that he is connected practically in some way with mining or metallurgy. Geologists, chemists, mechanical engineers, etc., are considered to be so connected.

3. The advantages of this liberal plan are: (1). It secures a large membership; and, consequently, at the moderate rate of \$10 annual dues, a sufficient income for the publication of valuable papers and volumes, with all necessary engravings. The value of these publications, on the other hand, is what retains the membership. (2). It attracts men of practical knowledge, but without special foregoing education—such as mine captains and the foremen of mines, furnaces, rolling mills, etc. Such persons are apt to shrink from association with graduates of schools, or from subjecting their professional qualifications to review. Yet they are the very men who can be most helpful, if they can be induced to communicate their observation and experience, without the risk of mortification. We have studied from the beginning to get hold of such men. (3). It results in the constitution of our membership to a large extent of young men with reputations to win, instead of men with reputations (and business interests) to guard. Membership of itself gives no professional standing; but it gives a large and appreciative public, and a chance not easily got in any other way, to win quick recognition for good work. In this way it has often led to the rapid advancement of men who would otherwise have been years in making their merits known. The natural consequence is, that we receive contributions in abundance, and that, although they are of unequal value, the general average is good; and each of our volumes contains as much first class professional matter as that of a society organized upon higher acquirements for membership.

4. But this result can only be secured by putting the control of all the affairs of the Institute into the hands of the Council. There is another reason for this course, namely, the scattered membership and the absence of any fixed place for meeting, from which it follows that the members attending a given meeting (usually less than 200 out of the 2,400) are chiefly those who reside in that vicinity, and are not by any means so fairly representative of the whole body as is the Council of 18 (President, Treasurer, Secretary, 6 Vice-Presidents and 9 Managers) elected by the members through the mails. In other words, we do not really regard any meeting as "the Institute," and we do not provide for any action of the Institute as a whole, except in the election of officers and members. At the annual meeting the Council presents its reports for the preceding year, but this is done for the information of members only, the report is not discussed or approved, but simply presented and subsequently printed and distributed.

5. The Council being thus omnipotent within its sphere, it is obviously necessary that this sphere should be carefully limited, and that the Council should be subject to steady but not too sweeping changes of membership. The latter end is secured by limitations upon re-election, except as to the offices of Secretary and Treasurer, in which frequent change would be injurious. The former point is of the highest importance, and is vigilantly guarded, partly by the rules, but still more by the construction placed upon them by numerous precedents. In organizing a new society upon the same plan, I think it would be well to make the rules more explicit even than ours, so that the question of the competency of the Council to do or recommend this or that might never be discussed.

In our practice (based upon the spirit of the rules, though not literally enjoined by them) neither the Council nor the Institute can do anything outside of the simple business of holding meetings for the reading and discussion of papers, and the publication and circulation of such proceedings. The collection of dues, the issue of circulars, the payment of certain expenses connected with meetings (not including social entertainments), etc., are necessary adjuncts to the work. But the contents of papers and discussions are expressly declared not to make the Institute responsible for any views or opinions; and we hold also that neither the Institute as a body nor the Council in its name can express any opinions by resolution or otherwise. For instance, we have pursued (with one or two early exceptions, occurring through hasty action, before we had duly considered all the bearings of the subject) the uniform course of refusing to recommend scientific, industrial or political measures, however meritorious—for instance, the metric system, an international nomenclature for iron and steel, uniform wire-gauges, methods of testing, the creation of government commissions, or the co-operation of the government in international expositions, all of which objects it is probable that many or most of us individually approve. But our theory is, that if a single member anywhere in the world might disapprove, with or without good reason of any such proposition, he has a right to demand of us that he shall not be indirectly committed to it by the action of a Council which he helped to select for an entirely different purpose, or by the vote of a local gathering of a minority of the members, in which he was neither present nor represented. I repeat that I think it would be well for a new society on our plan to settle this question at the outset, and include in its rules an explicit prohibition of all official expressions of opinion on every subject.

The practical benefit of the prohibition is very great. In the absence of such a rule or uniform practice, the danger is, that a precedent will be established by some enthusiastic action of the Council or of a meeting, on a subject in which all are interested, and all are of one mind—such as a

request to the government to continue some survey or inquiry of unquestionable benefit to mining. As the society increases in influence, the number of enthusiasts, specialists or speculators who desire to utilize its power will also increase; and numerous schemes will be offered for its approval. It is not practicable to consider each on its merits; and even if this could be done, an adverse decision would make trouble, and interfere with the main objects of the society. It is therefore unquestionably the wiser course to shut down, from the beginning, on anything of the kind, irrespective of its merits, taking the ground that the Society is simply an arena for the discussion of all pertinent topics, but for the decision of nothing whatever.

6. Thus limited, the complete power of the Council can do no harm, and the true work of the society will be conducted with the minimum of friction and labor. The interest and allegiance of members must be retained primarily by the value of the printed proceedings, and by the social good-fellowship (independent of all rules) which is made prominent at the meetings. In the latter respect we have found that the attendance of ladies accompanying members has been greatly beneficial. They are not likely to patronize the professional sessions to any considerable extent, but outside of these their presence is evidently promotive of social pleasure and of the formation of permanent family friendships. On this head, however, I venture the frank opinion that it is better not to invite the attendance of ladies unless a sufficient proportion of them can be expected. At our meetings the number of feminine guests is usually about half as large as that of the men. If it were less than one-fourth, I think there would be too many men subject to the restraints, without the compensations, of their presence. In other words, the average American lady can be trusted to make three men happy at once, but if the load be increased, the factor of safety is reduced; although there are plenty of samples for which not even the limit of elasticity can be determined by social machinery.

7. I may add, in conclusion, that a system different from ours may be preferred, perhaps, for different circumstances or different purposes—particularly for a society always meeting in one place, or always having at its meetings a large part of its members. I should not like to undertake to decide that question. But my feeling is clear and positive that any society attempting our plan ought to take the whole of it—that is, ought to prescribe a limited sphere of operations, confer absolute power upon its council within that sphere, make its terms of membership as liberal as possible, and prohibit all attempts to use its influence for any outside measure, however good (except so far as the treatment of the subject, in appropriate papers on individual responsibility, with full opportunity for counter argument, may be considered as a favorable measure). In my judgment, the system will not work harmoniously and successfully in any other way.

R. W. B.

#### BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.

*Mining Code of the Mexican Republic*, in effect July 1st, 1892. Published by F. P. Hoeck, City of Mexico, Mex., 1892. Pages 97.  
*Mexican Custom House Tariff, New and Old*. English Translation: Edited and published by F. P. Hoeck, City of Mexico, Mex., 1892. Pages 473.

#### NEW PUBLICATIONS.

COLOMBIA. BULLETIN No. 33, Bureau of American Republics, Washington, D. C. 8 vo., pages 128.

The Bureau of the American Republics, unlike the majority of institutions founded with a view to political effect, really has done good work in giving to the public much useful information. Bulletin No. 33, describes the Republic of Colombia, its resources, institutions and laws. Chapter I. contains a review of the area, physical geography and resources of Colombia. We find that the Bulletin gives the area of this most northern of the South American states at "about 513,845 square miles, of which about one-fourth is inhabited." The Bulletin does not mention that difficulties and dissensions as to boundaries still exist between Colombia and Costa Rica, Ecuador and Brazil, which, when settled, will have considerable bearing upon its area.

Misspelled words are unfortunately frequent in this volume, and actual misinformation is not always absent; thus we find on page 15 the statement that *sulphate* of mercury is abundant in a certain district of Antioquia.

Chapter VII. is devoted to "Mines and Mining." It is to be regretted that the compilers did not consult the files of the ENGINEERING AND MINING JOURNAL, in which they might have found interesting and reliable reports on the mining industry of Colombia. We take it that the Bureau of the American Republics has made use chiefly of Senor Vicente Restrepo's book on "The Gold and Silver of Colombia," a work in which so much that is merely legendary is given that it is entirely unreliable and of but little value to the engineer. Before the discovery of gold in California, Colombia was second only to Brazil in the production of this metal in the New World. Gold, indeed, is found to-day everywhere within its borders; not always, it is true, in paying quantities; but very frequently so, and since the country's mineral resources are so little developed there is much to hope for. To the lack of transportation facilities and scarce labor more than as sometimes alleged, to the instability of political institutions, must be attributed the tardiness of foreigners to exploit the resources of Colombia.

THIRD ANNUAL REPORT OF THE GEOLOGICAL SURVEY OF TEXAS: 1891. E. T. Dumble, F. G. S. A., State Geologist. Pages; 410. Maps and illustrations. Austin Henry Hutchings, State Printer.

This volume, the third issued during Prof. Dumble's term of office as State Geologist, contains much information as to the stratigraphic geology of the regions traversed as well as much information heretofore unpublished as to the mineral resources of these regions. Much more exact knowledge of the topography of the state is now in the possession of the Survey, owing both to its own work and the co-operation of the United States geological survey. This, as a matter of course, aids the survey in settling satisfactorily a number of important geological questions.

One of the most interesting, as well as the most important, in an economic sense of these reports is that of Mr. W. F. Cummins on the Llano Estacado or staked planes. A most important question to be solved by Mr. Cummins was the probability of the occurrence of artesian water in these arid plains. It was known that the strata had a dip from the northwest to the southeast, and it was thought that there might be underlying strata whose upturned edge at the base of the mountain range west of the plains would furnish a water bearing stratum, that could be penetrated by deep boring to the eastward of the Pecos River. It will be remembered that during the rush to California in 1849-1850 thousands of cattle and many human beings died from want of water in crossing these plains. It has been demonstrated recently that shallow wells can be sunk in almost any locality in the Trinity sands at the base of the Cretaceous formation, and which will furnish a practically inexhaustible supply of water.

As early as 1853, when surveys were made under the direction of the Secretary of War, a report was made stating that it was possible that artesian water could here be obtained, and an unsuccessful effort was made in 1858 by Captain, afterwards General, Pope, to obtain a supply from depth. Mr. Cummins, while not excluding the possibilities of obtaining a supply of artesian water from the Carboniferous strata at great depth, shows clearly that this could not be expected from the overlying Tertiary, Cretaceous, Triassic or Permian, and that if obtained at all, it would be at great expense, 4,000 ft. having to be sunk before any supply could be reached. This report shows clearly that these lands, one of the largest stretches of uninhabited territory in the United States, can never be utilized as a whole by the agriculturist if he depends upon artesian wells for a supply of water.

It is not generally known that Texas possesses promising silver prospects, but the report of W. H. Von Streeruwitz shows that it has some which may be regarded as promising mines; among others, the Hazel at the foot of the Sierra Diablo Cliff, 10 miles west of Allamore on the Texas & Pacific. This vein is nearly perpendicular, and has a width at the depth of 500 ft. of 34 ft., and below this widens to 40 ft. It can be superficially traced for several miles, and its nearly uniform thickness for 1,800 ft. is shown in the present workings. The vein is a fissure between walls of a fine-grained red sandstone of probably Devonian age, metalliferous to a certain distance from the vein. The gangue is a whitish colored calcareous silicate, more or less impregnated throughout nearly its whole width with copper and silver sulphides and other minerals.

The principal ores of the main and other veins are argentiferous copper glance, gray copper, silver glance, and native silver as well as considerable copper. Lead, antimony and arsenites are found in traces, and traces of gold are not infrequent; strongly ferruginous specimens assayed ninety-five-one-hundredths of an ounce in gold and 13 oz. in silver. The gray copper assays as high as 2,000 oz. and some assays of the copper glance have reached 600 oz. to the ton.

This report, as a whole, is instructive and interesting and reflects credit in every way upon Mr. Dumble and his efficient assistants.

#### CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

The Non-Homogeneity of Certain Gold Bars.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In reference to the interesting article by Mr. Louis Janin, Jr., which appeared under the above heading, on page 317 of your issue of October 1st, there can be no question that "liqutation" actually occurred in the commercial bars experimented on by him. Nevertheless the results given are not contradictory to the conclusion arrived at by Professor Roberts-Austen. If the "dip-samples" of the bars represented their mean composition, their fineness in gold and silver together was between 970 and 980, consequently 20 to 30 parts per 1,000 of base metal were present in these bars. Mr. Janin did not ascertain what this metal was, but it seems probable that its presence was the cause of the liqutation. Various authorities have stated that the presence of small quantities of antimony, arsenic, bismuth, lead, zinc, etc., in gold copper alloys will cause segregation to take place. Professor Roberts-Austen has suggested that the development of crystallization induced in the gold by these impurities may be answerable for this effect. The assertion that segregation really takes place appears to me to rest on the general experience of refiners and those engaged in melting bullion, as I have been unable to find any record of exact quantitative experiments on the subject. If Mr. Janin had made more extended tests some further light would certainly have been thrown on the question.

T. K. ROSE, B. Sc., Lond.,

Assistant Assayer to the Royal Mint.

ROYAL MINT, LONDON, Dec. 6, 1892.

The Outbreak of Gas in the Consolidated California & Virginia.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: If there ever was a criminal wrong done shareholders in a property, then the so-called "breaking out" of gas in the Consolidated California & Virginia mine is one. Lyman, the superintendent of this mine, has for years been in the employ of the company. He knew exactly where the dangerous ground lay. There was no necessity for him to run into that dangerous ground. If he is incompetent and knew no

better than to do this, then the Board of Directors of the company are doing shareholders a rank injustice in keeping him in such an important position.

If he is competent, then the gas was tapped for a purpose, and stockholders can do their own guessing as to that purpose.

The policy of concealment which has characterized the Mill management of this mine prevents shareowners from knowing whether or not there is any improvement in the property. There are some very suspicious circumstances connected with the tapping of the gas in the mine. On the very day that the greatest publicity was given to the gas business, the directors met and levied a fifty cent assessment on the stock. Apparently the intention was to break the stock as much as possible by committing all acts possible to gain that end. Now, let shareholders ask themselves—Why this gas business and assessment at the same time?

If the shares of the company were on the inside there would be nothing but glaring reports; but because the shares are out among the people, they tap gas and run the mine in debt while they are milling \$25 ore. If such infamy can be equaled in any other community then the writer knows it not. The remedy for this is in the hands of shareholders. If they would stand together and get rid of the thieves that are controlling this mine through proxies, they would soon have a dividend property. We will be pleased to help in this cause, and invite all shareholders in the Consolidated California & Virginia to communicate with the secretary of this organization.

John W. Mackay is one of the reputed managers of the Consolidated California & Virginia mine. He should be ashamed of such business, and unless he compels his dummy directors to satisfactorily explain, he deserves the execration and contempt of every right thinking person.

MINING STOCK ASSOCIATION,

per J. H. TINGMAN, Secretary.

SAN FRANCISCO, June 16, 1892.

#### DETECTION OF GOLD IN DILUTE SOLUTIONS.\*

By T. K. ROSE, B. Sc.

It is well known that if large quantities of boiling water are poured into a solution of stannous chloride, a yellowish white gelatinous precipitate of tin hydrate is obtained. If the water contains a little chloride of gold the precipitate is colored red (purple of Cassius). A solution of one part of gold per million parts of water treated in this way gives a bright rose color precipitate almost instantaneously in a small test-tube. One in four millions gives a paler color easily detected in a test-tube, if comparison is made with the precipitate caused by distilled water. For more dilute solutions a greater bulk of liquid is required, and the precipitation is best effected in beakers.

If 0.0000311 grm. gold (one-millionth of an oz. troy) is dissolved in 3.11 litres of water, and the solution, containing one part per hundred millions, is raised to boiling and poured suddenly into a large beaker containing 10 cc. of a saturated solution of SnCl<sub>2</sub> in water acidulated by HCl so as to mix the two liquids as rapidly as possible, a bluish precipitate is obtained. This precipitate, when collected in a test-tube, differs markedly in color from a precipitate obtained by pure water in the same way. There seems no reason why a still more dilute solution of gold should not yield a color if precautions are taken to insure the complete mixture of precipitant and solution.

Quantitative results based on comparison may also be obtained with care, as the precipitates are quite stable in water. The presence of NaCl (3 per cent.), CaSO<sub>4</sub>, KCl, KBr, NH<sub>4</sub>Cl, a little free HCl, etc., or all of these, do not interfere with the reaction. The precipitate is soluble in ammonia and is re-precipitated, showing its original color, on neutralising with HCl. Synthetically prepared sea-water containing gold to the amount of one in twenty millions threequarters grain per ton) is equally sensitive, but the color is in this case a blackish rather than a purple violet. I am proceeding to test real sea-water in the same way, though quantitative results cannot be expected, since Sonstadt states ("Chemical News," xxvi., p. 159) that only a small portion of the gold present is precipitated by stannous chloride.

This modification of a very well-known test appears likely to be useful in chlorination mills, where it is often desirable to detect the presence of gold in liquids containing as little as 1 in 5,000,000. The most dilute solution that reacts, if treated in the ordinary way by SnCl<sub>2</sub>, is one per million (vide text books, passim), and then only after a lapse of some hours.

**Method of Making Hard Bricks.**—In the western parts of Mongolia there are such rapid alternations of temperature that ordinary bricks and even the usual building stones disintegrate very rapidly. The inhabitants of that country have a process for making extremely hard bricks, sonorous, and having the appearance of trachyte. The article by Mr. E. Blanc in *Dingler's Polytechnisches Journal*, describing the process, does not inform us as to the exact constitution of the clay. The brick kiln is in the shape of a vertical cylinder, surmounted by a dome. There is a rather wide hole in the top of the dome, and during the first part of the process the hole is left open. Three draught chimneys built inside the furnace open outwards at the height of the dome and are kept closed with clay at the beginning of the operation. The kiln is heated for three days during the first part of the process, and then the hole at the centre of the dome is gradually reduced in size, by means of blocks of moistened clay. The flame is allowed to die down and the small hole remaining is covered with wet felt. The felt is covered with sand which is continually kept moist. The three lateral chimneys are then opened and the fire lighted again. The draught is thus reversed and the second stage of the process thus commenced lasts for four days. During this time the water from the felt is heated and fills the kiln with an atmosphere of superheated steam. At the beginning of the second part of the process the bricks have light red color and this changes to uniform dark gray. At the end of four days the bricks are completed.

\* Abstract of a paper presented to the Royal Dublin Society, November 13th, 1892. Through *Chemical News*.

## THE MINES OF SOMBRERETE, MEXICO.

Written for the Engineering and Mining Journal.

The first mines discovered in this locality were those of La Canada. It is probable that it was some time after this that the Pabellon, Veta Negra and San Lucas veins were discovered. They are situated on a hill known as the Cerro de la Cruz. The Pabellon vein is the most important in Sombrerete, having a width of 64 ft., according to the statement of Mr. Francisco de P. Zarate, an engineer who visited this department for the Government of the State at the time when the property was owned by Mr. Nestor Ontiveros. The Pabellon ores differ considerably, but the sulphide ore runs from 560 oz. to 4,200 oz. to the ton.

The famous Veta Negra has a width of 32 inches, although sometimes it narrows down to 8 inches. It is precisely where the vein thus pinches that the ore is of the highest grade. During the Eighteenth Century this mine produced immense quantities of silver. At the time when it was being exploited, work on the Pabellon and San Lucas veins were commencing. The owner of the latter, Senor Fagoaga, became discouraged with the results and was about to abandon them when a strike of a large body of ruby silver was made. During that period the production of silver was considerable, amounting, it is said, to \$11,000,000 in eleven months. Unfortunately there is no really authentic data on the subject, but it stated that the daily production of silver was \$20,000, free of cost.

In the department of La Canada are found the Rosario, San Francisco, El Refugio, San Amaro, Las Marias, San Jose de la Cumbre, La Joya and Cruz de Moros mines, although some of these are really outside of La Canada. Of all of these the San Francisco mine, up to date, has produced the most at various times, although the others are important for the high grade of their ore, notably the Las Marias.

The San Francisco vein seems to be a branch of the great Pabellon vein, which divides into two. A confirmation of this may be found in the difference in width which, in the mine of which we speak, is from 10 to 13 ft., although sometimes it is only 6½ ft. The ore contains lead, silver, antimony, iron and arsenic, and other metals in smaller quantities. At present the mine is in very good condition, and the Santa Rosa mill is unable to concentrate all the ore produced. The concentrates are shipped to San Luis Potosi for reduction. The Sombrerete Mining Company, which owns this and the Pabellon properties, has two large steam engines of 500 H. P. for hoisting ore and balling—one on the San Pedro and the other in the San Francisco. The gangue of the vein is a decomposed chloritic slate. The concentrates run from 72 oz. to 128 oz. to the ton, although it sometimes goes higher. The lowest workings are at a depth of 960 ft.

The company is now working only the San Francisco mine, but it is said that it will shortly commence operations on the Pabellon and Veta Negra system. In the San Pedro shaft, as has been stated, there is already lifting machinery of sufficient power. The ore in the latter vein system is richer than in the San Francisco, and this should urge the company to work earnestly.

The history of the American ownership of these mines may prove interesting. They were acquired about 1880 by George Tew, acting for an American syndicate. The first cost was merely nominal, indeed we believe that the property had been abandoned, and that simple re-location was all that was necessary to secure these properties. Boston and New York capital was secured, and operations were commenced on a large scale, as far as the projected mining work was concerned.

Two large and powerful hoists, air compressors and other expensive machinery were brought. Two shafts were commenced in the Santa Maria to cut the Veta Negra vein at the depth of 1,200 ft., and the San Francisco to explore the Pabellon. The first shaft was never completed, although sunk to a depth of 1,000 ft., owing to lack of funds, and the Veta Negra vein and its possible bonanzas are filled with water. In the San Francisco shaft the company was more fortunate. Below the 700 level a good body of ore was struck. It occurred as one of medium grade, with occasional pockets of higher grade sulphides.

The extravagancies of the management had eaten up the large working capital, and the owners were little disposed to advance more, as they had been badly bitten in other ventures, notably the Harshaw, of Arizona, the Minas Prietas, of Sonora, Mexico, and the Las Yedras, of Sinaloa, the last two of which had not begun to be profitable at that time. For this reason it became difficult to treat the ore which they had then found. It was true that the company had purchased an old Hacienda de Beneficio, but the modified patio process which had been employed before, was costly, in American hands at least, and abhorrent to American minds. George Tew, who had found the property and who had succeeded, after several changes had occurred, to the management, was determined to make a profit, and with a few additions to the already heterogeneous mass of machinery, began the working of ore by roasting and lixiviation and by concentration. The concentrates were shipped to the United States and a portion, if not all the precipitates, from the lixiviation works, refined on the spot. These, later, were shipped to Denver.

Tew, in spite of his crude plant, made money, until, finally, over \$100,000 was on hand, when it became apparent that to work the low grade ores of the mine, as the high grade bodies had been worked out, it was necessary to erect a more economical plant. Tew's success, and the large quantity of low grade ore in the mine, aroused the interest of the owners and stockholders, the late Frederick Billings, of this city, among others, and it was determined to erect a modern plant, capable of treating the base, low grade ore at a low cost. The success of lixiviation in the old plant, and the prominence that the Russell lixiviation process was then attaining, decided the management to erect a plant to use this improved process and elaborate plans were drawn. Mechanical roasters were to be employed instead of the old, but efficient, reverberatory furnace, rolls were to be adopted instead of a cumbersome mechanical crusher then used, and, speaking generally, every improvement then known was to be introduced, so as to make

the labor employed a minimum and the extraction as perfect as possible. The mill was accordingly built with Stetefeldt bry kilns, Eckart rolls, Stetefeldt furnace and a complete lixiviation plant to treat the roasted ore.

It was not without due forethought that these devices were adopted, experiments with the Stetefeldt furnace in particular having been made on a car load of ore at the Ontario Mine, Park City, Utah. As for the Russell process, it had already been thoroughly tested, and its efficiency over the Patra process clearly proven at the old plant. All was now ready for the completion of the plant. This occurred in May, 1889.

From the very start the results were poor. The capacity of the rolls was not what was expected, the furnace did not chloridize properly, and, as a consequence, the extraction was low.

It soon became apparent that to achieve good results the ore must be crushed fine, although good results were obtained from coarse ore roasted in the reverberatory furnace. This, however, was a different matter from letting it fall through the shaft of a Stetefeldt, even when that was prolonged to a greater extent than had been done before. Then a novel experiment was employed to furnish sufficient ore to de-oxidize the sulphide ore, consisting of pyrite, galena and blende; 14 tuyeres, supplied with air from the rotary blowers, were inserted at various portions of the furnace. Even this expedient was not a success, and it was not until the ore had been heap roasted, preliminary to chloridizing that a successful run, and that a single run of small tonnage, was made. Soon after this work was discontinued, the mill being unfit for work, it was said. However, we have been informed that the extraction during the months of experimenting had not averaged over 40% in return of bullion. The construction of the plant and the costly experiments had exhausted the treasury and the patience of those who had been advancing money, so, through lack of funds, the mine itself was allowed to remain idle. It was then "jumped" by several Mexican residents at Sombrerete, and it was only after much trouble that the title was made clear. Now, however, we understand that the property, which is being worked under a lease by the Mexican Metallurgical Company, an offshoot of the Kansas City Smelting and Refining Company, is making money. This company built a concentration plant at the beginning of this year and ships the product to its own furnaces at San Luis Potosi.

## COST OF PREPARING CAUSTIC SODA AND BLEACH BY THE ELECTROLYSIS OF SALT

Many processes have been proposed and tried, experimentally, for manufacturing caustic soda and bleach from common salt by electrolysis, but actual figures of the cost of such processes have never been ascertained, or at least published. The first time that impartial figures have been made public was in a communication to the Society of Chemical Industry, on Dec. 5, by Messrs. Cross and Bevan. These chemists, on that occasion, gave a long account of the cost of the Le Sueur process, and, though the accuracy of some of the items is debatable, the estimate gives a sufficiently correct idea of the cost of the electrolysis of salt to make it worthy of record.

A plant to treat 18 tons of salt per day of 24 hours would comprise a pair of engines, each of 1,200 I. H. P., dynamos and electrolyzing vats. The cost of maintaining this 2,400 I. H. P., with coal at 10 shillings per gross ton, and depreciation at 10% per year on engines and boilers, would amount, on very liberal allowance, to £60 per 24 hours, or ¼d. per horse-power hour. The loss from indicated horse power to electric power, delivered at the terminals of the vats may be taken at 17%, so that the effective horse power would be 2,000 H. P. This would give a current of 331,555 amperes at 4½ volts, and the available ampere-hours in 24 hours for the work of decomposition would be 7,957,320. Each ampere-hour is theoretically able to produce 0.00292 lbs. of chlorine and 0.0033 lbs. of caustic soda, so that with a possible efficiency of 80% in the operation, the actual daily output in this case would be 8.3 gross tons of chlorine, equal to 22.43 gross tons of bleach, and 9.378 gross tons of caustic soda. The bleach at £7 10s. per gross ton, would bring £168, and the caustic soda at £12 per gross ton would have a value of £112 10s. The total value of the product would be £280 10s. The cost of production would be made up as follows: power, 57,600 horse power-hours, £60; 18 gross tons salt at 12s. per gross ton, £10 16s.; 12 gross tons of lime, at 12s. per gross ton, £7 4s. labor, £10; casks, packages, etc., £18; depreciation at 10% per year on electrolyzers, dynamos, tanks, pumps and buildings, £10; cost of renewal of diaphragms and anodes, £30; superintendence, £5; total, £151. In addition to this there is the interest on capital to be reckoned for and minor expenses, amounting, altogether, to another £10, probably. This would bring the expenditure per 24 hours to £161, as compared with £280 receipts. The cost of the plant would be about £50,000. The item for £30 per day for renewal of anodes and diaphragms seems extravagant. The diaphragms are composed of parchment paper and asbestos cemented together with coagulated blood albumen, and they require renewal every 48 hours. The anodes are composed of rough rods of gas carbon, and have to be renewed every six or eight weeks. What the total consumption of anodes and diaphragms in this plant is, is not given, but £30 per day must surely be a mistake.

**Oxidation of Nickel Carbonyl.**—If nickel carbonyl is kept in an ordinary bottle with a ground glass stopper, a layer of light green hydrate is formed on the top, while some of the carbonyl escapes as a vapor between the stopper and the bottle and is deposited on surrounding objects. M. Berthelot has chemically examined this product of decomposition, and states in the *Bulletin* of the French Chemical Society as a result of his researches, that it appears to be a hydrated oxide of an organo-metallic compound of nickel having a composition corresponding to the formula  $C_2O_2Ni \cdot 10H_2O$ . It therefore appears to be the oxide of a complex radical analogous to croconic and rhodizonic acids. While spread in a thin film this compound is white, but when viewed in mass it has a greenish tinge.

## FISSURE VEINS IN THE CABINET ANTICLINAL, LIBBY, MONTANA.

Written for the Engineering and Mining Journal by Herbert Wood.

The Cabinet Range of Mountains, forming an anticlinal, in the Cambrian or Pre-Cambrian Rocks, is located along the western borders of Montana, 40 miles from the Idaho line, 30 to 40 miles east of 116th meridian, extending northwest 20° from the 48th parallel to the vicinity of the 49th. It is intersected nearly midway by the Kootenai River flowing west of Bonner's Ferry. The range in one or two peaks, rises possibly 10,000 ft. above the sea level, but at the town of Libby on the Kootenai River, at the entrance of the Libby Creek Valley, the height is 2,000 ft. The valley rises in going southward for 18 miles along Cherry Creek 1,250 ft., or to 3,250 ft. above the sea.

The country rises gradually from Cherry Creek eastward, forming the foothills of the Range, six streams issuing from the range, flowing westward, with a variable fall of 200 to 300 ft. to the mile and joining Cherry Creek. At the summit of the foot hills, or at the immediate entrance of the gulches of the range proper, the barometric height is 4,000 ft. From this point to the central portion of the anticlinal the ascent is rapid, the country rising in a distance of three miles 1,200 ft. The general trend of the axis of the anticlinal is 20° W. of north—the rocks (black slates or shales with thinly bedded quartzites), dipping east and west at rapidly divergent angles from 80° to 50° in several hundred feet. The most easterly dip obtained was 35° four to five miles from the axis of the anticlinal, making the anticlinal presumably 8 to 10 miles in width.

Geologically considered, the range constitutes an anticlinal or upheaval dating in the Pre-Cambrian Age, the rocks at average estimate being 15,000 ft. in thickness.

The anticlinal has had a probable elevation of 12,000 ft. By glacial erosion, which acted from the west toward the east, about 6,000 ft. of the upper surface of the anticlinal has been denuded, the gulches being 2,000 ft. deep, the detrital material forming the foothills in part in great mounds of 700 ft. in thickness. The rocks do not show a vast amount of torsion or squeezing, but a lateral pressure is very evident in a series of small sub-anticlinal folds, which extend along the gulch bottoms. Extending for 10 or 12 miles through the anticlinal, nearly parallel with the axis and not far distant, a series of fissure veins is seen, which for their geological peculiarities, are of scientific interest. These fissures are not anticlinal cracks in the true sense of the word, but are the result of a general subsidence of the anticlinal, a gradual relaxation of the strain applied at the lower outer margins of the fold following the lateral pressure. The main vein, on which a large number of locations are made, reaches the summit of the denuded portion of the anticlinal. This fissure increases in width as it approaches the bottom of the gulch, being 1 to 2 ft. at the summit (7,000 ft. above the sea), and 5 to 6 ft. or more at 6,000 ft. above the sea. It has been traced for ten miles or more with a strike 20° to 25° W. of north. It is a ribboned vein in character, without marked regularity in structure, the result of mechanical energy producing heat, and depositing from the heated silicious mineralized water galenas, zinc blende, some copper pyrites and iron pyrites in a quartz and siderite gangue.

This vein in Snow Shoe Gulch is 48 in. in width. The walls, consisting of a black graphitic slates and thin bedded, greyish quartzite of a fine compact texture, are decomposed into a clayey, steatic substance. Three-fifths of the vein consist of mineral, averaging from 30 to 60 oz. per ton, suitable for a concentration or smelting. The quantity of ore in 1,000 ft. of depth and 5,000 ft. in length, taking the vein as 3 ft. in width, half ore of a specific gravity of 4, is nearly a million tons. The vein improves materially in depth, and widens in accordance with the principles of subsidence following the relaxation of strain from lateral pressure. Eight miles north of this presumably the same vein, lying in close proximity to the axis of the anticlinal at a height above the sea of 3,750 ft., is observed. It is here marked by a series of stringers extending upward and outward from the main vein, following the joint fissures at an angle of 30°. These stringers are strongly mineralized and are characteristic of the vein through its entire length, being the result no doubt of mechanical energy and the consequent seepage of heated silicious waters toward the cracks and along the more squeezed and disrupted portions of the strata. Two miles east of this vein is another vein dissimilar in character, consisting of lead and antimonial sulphides in small quantities in a quartz gangue. It is richer in its mineralized portions and holds quite a percentage of gold. Indeed, the base of the range and the opening of the gulches is piled with boulder-gravel beds, which can be successfully worked as placers. The placers of British Columbia and the Kootenai country generally are the result of the disintegration of veins holding argentiferous galenas and were in most instances discovered and worked prior to the discovery of the quartz lodes themselves. This extreme belt extending from the Selkirk range down to the Coeur d'Alenes in Idaho is essentially a lead-silver range. The wearing down of the country rock and natural concentration of gold had been in progress from the close of the Miocene or Middle Tertiary Period to the Glacial Period. No doubt in this instance denudation has extended over many geological epochs, possibly since their upheaval in Paleozoic times—though plenty of evidence in the form of glacial, striae and grooved and polished rocks were observed. The fissures produced by the strain on subsidence are not then confined to the axial portions of the anticlinal, but extend both east and west of it. This country is as yet practically undeveloped—tunneling along the vein which is the readiest way of development, is going on, in several locations. The difficulty of access having been largely overcome by the recent completion of the Great Northern, to within 10 or 12 miles of the vein, road building for shipments is contemplated, and this camp will shortly take a prominent place among the silver-lead producers of Western Montana.

A new precipitant for gold has been discovered. It consists of sulphide of copper and the sulphides of iron and sodium.

## CAUSES OF DISCREPANCY IN CHEMICAL ANALYSIS\*

By Dr. C. B. Dudley.

Two chemists working on the same sample rarely obtain the same figures for the various constituents, especially when, as in the case of carbon, sulphur, etc., in iron and steel, the percentage of each is extremely small. For instance, in a series of sixteen determinations of sulphur in a piece of pig iron, with which I was connected, the figures varied from 0.005 to 0.02%. Similarly, some time ago some borings from a piece of pig iron were sent to eight different chemists for phosphorus determinations, and the highest figure was just double the lowest. It is, of course, an impossibility to obtain strict accuracy in any chemical analysis, and all that an intelligent and experienced chemist can hope to strive after is to eliminate all known sources of error, as far as is commercially possible, and to approximate as closely as he can to the absolute truth. There are four main causes of error to which may be attributed the discrepancies between the results of different workers. Firstly, the sample may not be the same, although supposed to be so; secondly, the degree of purity of the chemical reagents always varies; thirdly, there is a "personal error" in manipulation, and there are various causes which prevent any particular method from being carried out in the usual way; and, fourthly, each individual operator may use a different method from the others, and the results given by each method may be regularly higher or lower than the truth. Each case of variation in these four classes is always extremely puzzling, and it takes a learned and acute chemist to locate the error. In my own experience at Altoona, while serving the Pennsylvania Railroad Company, I have met with many cases of variation of results, and without doubt my experience is similar to that of all of my profession.

As regards the first cause, I have not been troubled with many cases in my experience. I remember once we were buying some special springs, whose carbon should not exceed 0.9%, to be used to keep the lid of the oil boxes under the cars closed. We analysed some external filings and found the carbon too low, and so rejected them. The manufacturer, however, on reanalysing them, turned off the exterior and took his sample from the centre. This sample gave the right carbon constituent that was required in the specification. The difference between his analysis and ours was caused by the different sample chosen by each. The outer layer of a steel wire rod, which has been heated, usually loses 10% of its carbon.

The second cause of discrepancy, viz: the variation in the purity of the chemicals, is one which every chemist is familiar with. Some time ago we were mixing up some wash water of sulphate of ammonia and free sulphuric acid for washing the yellow precipitate in phosphorus determinations. After washing a few minutes, the filtrate became turbid, and gradually increased in turbidity. It appeared as if the yellow precipitate was not really insoluble in sulphate of ammonia and sulphuric acid, but on looking into the matter we found that the commercial sulphate of ammonia contained a little phosphorus in it. There are two ways of ascertaining the purity of reagents. The first is to test them for impurities, and the second is to make a dummy analysis with the article to be analysed omitted. The first remedy is always uncertain, as it is impossible to test for every known substance or combination of substances. In the work of the International Standards Committee in carbon determinations, the chloride of ammonia was found to give bad results, and it was only accidentally found out that it contained some organic matter. Such a thing would never be analysed for. The dummy analysis is also far from satisfactory, as there is nothing to prove that the reactions between the chemicals and their impurities will be the same in the absence as in the presence of the substance to be tested.

The third cause, that of personal error, introduces discrepancies through differences of manipulation. Many times these errors arise from the indefiniteness of the instructions, such as, "add a little of this or that," or, "heat to a temperature of from 330° to 310°C. The weighing and measuring of constituents may be done by scales or by guess. Some men spill a little here and there, and so on. Again, some chemists study each step intelligently, while others simply follow the instructions of the book without inquiring into the why and wherefore. I remember an interesting case which occurred sometime ago at my laboratory, which illustrates this point well. We analysed a tire and found about .14% of silicon in it. We used Drow's method, dissolving in sulphuric and nitric acid, evaporating until the sulphuric acid fumes, and then diluting with hot water and filtering. The chemist of another railroad happened to see our result, and found it gave just half his figures, viz: .28% Si. On his drawing our attention to the discrepancy, we conducted our analysis again and found that his figures were right and ours wrong. On investigating the cause of our error, we found that the test had been interrupted in the middle and had been laid aside for two days, whilst something else more pressing had been attended to. The operator had dissolved the steel and evaporated to fuming point, and then, after diluting, had placed it on one side. This pause in the test had introduced the error, though it was only after some time that this cause was discovered, for such a cause had never been anticipated, nor is it known generally. Apparently the silicon obtained by the sulphuric acid method is not dehydrated completely. If it is allowed to stand forty-eight hours, half is lost, and a six days' rest leaves only .06%.

The fourth cause, that of method, is the one which may be most easily eliminated in commercial analysis. Different methods and treatments of the same method give different results and introduce discrepancies between the makers and the buyers' results. Hence, I propose that in every specification the test shall be included. I am hoping to be able to introduce this innovation in the Pennsylvania Railroad Company's specifications, for, although it is apparently a high-handed proceeding, it will certainly get rid of disputes and simplify matters generally. You see, if steel low in phosphorus is desired, it is the interest of the user to employ a method that gives high results, whereas the

\* Abstract of paper read before the Chemical Section of the Engineers' Society of Western Pennsylvania.

steel work's chemist prefers, naturally, a method that gives a low result. Now, the only way to prevent a dispute is to specify a certain method of analysis. The desirability of adopting a universal series of tests that shall always be specified, is a point that I feel very strongly about, and if some learned society could adopt a standard series of tests, to be used in commercial analysis, a great boon would be conferred.

There are multitudes of cases where errors arise through differences in methods that are not to be attributed to this desire to obtain uniformly low or high results. I call to mind a case in point. In a determination of tin in bronze, we never weigh up the metastannic acid as we separate it from the bronze by means of nitric acid. We have never yet succeeded in getting all the iron and all the copper away from the oxide of tin by means of nitric acid. Also if the bronze contains any phosphorus, it will go down with the tin. So we dissolve our metastannic acid in sulphide of ammonia, filter and reprecipitate the tin sulphide. In this way we always get a little copper out and, sometimes, a little iron. We do not, of course, completely separate the whole of the copper from the tin, yet we get much nearer the truth than before. This difference in method produces different results.

EXPERIMENTS WITH THE CYANIDE PROCESS.

Written for the Engineering and Mining Journal by G. E. Kedzie, M. E.

The following series of experiments were made with the view of determining whether the gold bearing pyritic ores in the immediate vicinity of Ouray, Colo., could be successfully treated by the cyanide process, also to learn the conditions under which the most complete extraction could be obtained, together with the amount of cyanide consumed. The results are given herewith, in the hope that they will be of benefit to others pursuing similar investigations.

*Description of Ores Treated.*—A, raw ore, iron pyrite with some copper pyrite and magnetite; B, tailings from lot A after laboratory amalgamation; C, raw ore iron pyrite with quartz gangue; D, concentrates, iron pyrite with magnetite; E, raw ore, iron pyrite with a limestone and actinolite gangue; F, tailings from lot E after laboratory amalgamation; G, raw ore, iron pyrite and copper pyrite with a quartz gangue; H, tailings from lot G after laboratory amalgamation; I, raw ore, iron pyrite, partially oxidized with a clay gangue; J, concentrates iron pyrite with a limestone gangue; K, concentrates of tailings after battery amalgamation iron pyrite with magnetite; L, concentrates of tailings after battery amalgamation iron pyrite with magnetite.

*Manner of Conducting the Experiments.*—The ores were weighed into beakers from 150 to 300 cc. capacity, the measured quantity of the potassic cyanide solution added and the beakers covered with convex glasses. Once in 12 hours the contents of each beaker were thoroughly agitated with a stirring rod. The temperature of the solution during the tests varied between 22° and 27° C. After treatment the cyanide solution was poured upon a filter, the tailings twice washed in the beaker with warm water, then transferred to the filter and again washed.

The gold and silver values in the high grade ores and tailings were determined by three scorification assays. With the low grade ores and tailings the gold and silver contents were determined by two crucible assays of one-half assay ton. The percentage of potassium cyanide in the lixiviating

solution and that remaining uncombined in the filtrates were determined volumetrically by a neutral deci-normal solution of silver nitrate.

When potassium cyanide is referred to in this paper reference is made to the chemically pure reagent.

*Deductions.*—From an inspection of the tabulated experiments it will be observed that the following deductions may safely be made with reference to the ores treated. 1. The gold is more readily extracted than the silver. 2. Under the same conditions the percentage of extraction is increased (a) by the fineness of the pulp. (b) by the duration of treatment. (c) by the strength of the cyanide solution. 3. The greater the amount of cyanide added to the ore the higher will be the percentage of extraction, but in this case the total values extracted for each pound of the cyanide consumed are less than when a smaller amount of the cyanide is added. 4. When the same amount of cyanide is used for each ton of ore treated, the percentage of extraction is greater when the weight of the solution is equal to that of the ore taken.

*Conclusions.*—It will readily be observed that there are no flattering indications of this process being a metallurgical success with the pyrite ores under consideration.

With the high grade ores, which are under no circumstances adapted to this process, the percentage of extraction under the most favorable circumstances is low; lower even than the results obtained by amalgamation. However, the total values extracted for each pound of cyanide consumed are relatively high.

With the low grade ores, even where the low value of the tailings will admit of their being thrown away, the total values extracted in a majority of instances are less than the cost of the cyanide consumed, to say nothing about other milling expenses.

To those interested in a further investigation of this process as regards its adaptability to ores of a different character, I would make the following suggestions: The strongest solution used should not contain to exceed one-half of 1% of potassium cyanide, and good results are anticipated with a much weaker solution. Arrangements should be made for the slow percolation of the cyanide solution so that at all times the ore will be in contact with a solution of nearly normal strength. Finally the period of lixiviation should be extended to 96 hours if necessary in order to secure a more complete extraction.

HUNICKE'S PROCESS FOR SMELTING SILVER LEAD ORES CONTAINING ZINC

The problem of finding an economical process for smelting zinc-bearing silver lead ores in which the galena and zinc blende are intimately mixed is attracting a good deal of attention among metallurgists at the present time. The process recently devised by Mr. H. A. Hunicke will, therefore, be of considerable interest to our readers, although time has not yet been allowed for proving its final commercial value.

The process consists in heating up separately the roasted ore and the coke to about the temperature at which zinc oxide is reduced to metallic zinc by carbonic oxide, and then charging thin layers of each alternately into a cupola furnace. The lead is reduced to the metallic state and runs, together with the silver, to the bottom of the furnace. The zinc is reduced to the metallic state and volatilized, and after escaping from the heated mass, is rapidly oxidized again by the gases. The vapor thus formed is led to a condensing chamber, where it is deposited as zinc oxide powder. The reduction of the lead and zinc is effected almost immediately after the introduction of the ore into the cupola furnace, owing to the smallness of each charge, and also to the fact that the ores have been previously heated to the temperature at which the zinc ore is reduced by carbonic oxide. Thus the zinc vapors have no opportunity to clog up the coke and prevent further combustion.

This process differs from the usual one in the previous heating of the ore and fuel, and in the smallness of each charge. Apart from more ready freeing of the zinc and prevention of clogging, the chemical process is the same all through, and the chemical losses of lead and silver are practically the same. There will, however, be more heat expended in heating the two separately and charging them hot, and more labor will be necessary in charging them often and in small quantities. If the ores are brought to the cupola furnace direct from the roasting furnace, some expenditure of heat would be saved, but there would be considerable difficulty in making the output of the two furnaces correspond.

The condensation of the zinc oxide can be carried out to as great a stage of perfection as is commercially profitable. Mr. Hunicke estimates that it is quite feasible to obtain 60% of the metallic zinc when ores containing 16% are worked with.

An objection which may be urged against the process is that it requires a constant uniformity in the chemical composition of the ores. So far no such difficulty has arisen in actual practice, as all ores can be treated satisfactorily. On whatever ores Mr. Hunicke has worked good results have been obtained, and an extra \$5 or \$10 per ton of ore has been realized by the recovered zinc oxide. No doubt the process will have to be adapted to each separate ore on which it is employed, but there is little doubt of its applicability, for it attains an end hitherto unattained—the separation of zinc without fouling the coke.

*Peat in the Blast Furnace.*—It is stated that a Mr. Brunton, of London, has organized a company to use peat in smelting iron at Dartmoor, in the west of England. Such a process was used in Michigan some twenty years ago but without success.

*Still Hope for Prospectors.*—The alarm felt by many prospectors, that the world will soon be so thoroughly investigated that there will remain no virgin territory in which to search for mines, is groundless. Not only will there be large territories, the government over which will in time see the advisability of encouraging mineral development, however restrictive they may now be, but there will remain large areas in which progress must necessarily be slow, owing to their inaccessibility and the hardships to be encountered by the pioneer. Such are the Asiatic regions, the far Northwest and sections of Central Africa, in which prospecting will not be safe or indeed advisable for many years. Then, again, new metals are coming into use, and the catalogue of useful ores is constantly increasing. There can be no doubt that the prospector will always exist.

Lot	Number	Assay Value per Ton of ores treated.		Grammes of ore treated.	Cyanide Solution added.		Hours of Treatment.	Extract per cent.		Pounds KCN added per ton.	Pounds KCN consumed per ton.	Total value extracted for each pound of cyanide consumed.
		Gold, oz.	Silver, oz.		Gold	Silver.						
A	1	1.75	1.65	25	25	.9	12	25.71	21.21	18	9.6	\$.38
	2			25	50	.9	12	54.28	33.33	36	11.4	.72
	3			25	25	.9	12	37.14	21.21	18	15.8	.85
	4			25	25	1.5	48	40.00	27.27	30	27.4	.53
	5			20	20	.5	48	52.14	15.15	10	7.4	2.55
B	1	.93	1.37	25	25	.9	12	46.24	2.98	18	14.6	1.10
	2			25	25	.9	12	84.62	29.10	18	13.2	21.70
	3			25	25	.9	12	9.49	2.06	18	14.0	26.48
	4			25	25	.9	48	10.58	1.50	18	12.8	24.67
	5			25	25	1.5	48	12.16	3.78	30	14.8	25.16
C	1	145.90	458.00	25	50	1.5	60	25.09	8.27	65	37.4	20.61
	2			25	50	.5	48	7.16	1.28	10	4.0	53.72
	3			25	25	.9	12	6.32	.90	18	6.6	9.49
	4			25	25	.9	12	15.73	2.24	36	12.6	11.71
	5			25	25	.9	48	18.20	2.74	18	15.8	10.62
D	1	46.16	69.20	25	25	.9	12	78.72	88.88	18	8.6	1.00
	2			25	25	.9	48	83.00	59.30	30	24.0	.36
	3			25	25	.9	48	83.33	69.23	18	14.0	.42
	4			20	20	.5	48	50.00	42.31	10	7.8	.45
	5			20	10	1.	48	2.31	3.40	10	7.4	.17
E	1	.47	1.35	25	25	.9	48	9.50	.81	18	16.0	.63
	2			25	25	1.5	48	15.29	3.12	30	27.6	.57
	3			25	50	1.5	48	18.39	5.45	60	50.8	.39
	4			20	20	.5	48	16.32	2.95	10	8.0	2.10
	5			20	10	1.	48	18.18	1.09	10	6.2	1.95
F	1	.30	1.30	25	25	.9	48	19.35	.26	18	15.8	.77
	2			25	25	.9	48	11.23	1.03	10	7.6	1.23
	3			20	20	.5	48	41.82	2.98	10	8.8	.90
	4			20	20	1.5	48	73.27	45.45	30	20.0	2.56
	5			40	20	1.	48	22.95	22.72	10	8.4	1.77
G	1	5.40	73.00	20	20	1.5	48	4.63	3.61	30	27.6	.39
	2			40	20	1.	48	2.77	.48	10	8.6	.39
	3			50	25	1.	48	70.37	18.46	10	7.0	.56
	4			50	25	1.	48	74.07	13.84	10	8.1	.51
	5			50	25	.5	48	40.74	7.70	5	3.7	.61
H	1	.38	.98	50	25	1.	48	48.15	7.70	5	4.2	.63
	2			50	25	1.	48	23.68	28.57	10	7.4	.28
	3			50	25	1.	48	36.84	22.44	10	7.8	.39
	4			50	25	.5	48	15.80	14.28	5	3.2	.42
	5			50	25	.5	48	23.68	18.36	5	3.3	.60

## PRODUCTION OF AMMONIA FROM NITRIDE OF TITANIUM.

In our issue of the 8th of October we quoted a paragraph from the *Boston Journal of Chemistry* in which the statement was made that if nitride of titanium is heated in hydrogen gas, ammonia is given off and that the nitride can be reproduced by heating the substance in nitrogen. If such a process were possible, we have at once a continuous process for the production of ammonia direct from its constituent elements, and in quoting the note from our contemporary we stated that we should be glad to hear of any investigation on the subject. Professor Huntington, of King's College, London, has kindly answered our inquiry by sending us his note book in which are described a large number of experiments on the subject.

While no conclusive result has been obtained from the experiments as yet, it may be of interest to give some account of such as gave some indications as to the truth of the general principle. Nitride of titanium was prepared by Professor Huntington by passing ammonia gas over combed asbestos soaked with titanium chloride, the tube containing them being heated to redness in a combustion furnace. After heating for some time, the asbestos was found to be permeated with powdery nitride of titanium. The asbestos and nitride were placed in a tube over a gauze gas burner and heated in a stream of Dowson gas (CO, 30%; N, 47%; CO<sub>2</sub>, 3%; H, 20%). At first some ammonia was given off, but not continuously or in large quantities. In another experiment, nitride of titanium was prepared by heating to redness some precipitated oxide in a stream of hydrocyanic acid. When this nitride was heated in Dowson gas, to which some more hydrogen was added, ammonia was evolved in quantity. Many other experiments were tried to see if titanium nitride had any effect on a stream of nitrogen and hydrogen mixed, but no union could be detected, and no trace of ammonia was to be seen. In another experiment, titanium oxide was heated to redness while ammonia was passed through it. The nitride thus prepared was heated further with nitrogen, and subsequently in a current of hydrogen. A small trace of ammonia was given off with the hydrogen. On blowing through again with air, and subsequently passing through a current of hydrogen gas, further traces of ammonia were detected. The experiments here described probably give in full our information on the action of nitride of titanium.

## SOME POINTS IN MILL CONSTRUCTION.

Written for the Engineering and Mining Journal by Louis Janin, Jr.

The reduction of ores in many cases would be cheapened if the designer of the plant had actual experience in running one, so that he could appreciate the disadvantages of a poor arrangement. In stamp mills in particular this is true. Mills have been built with ore-bins having their bottoms almost flat in order to gain capacity; whereas they should have a slope of at least 45° in order for the ore to move by its own gravity when it is drawn from the chute. The planking for the bottom in many instances has been placed transverse to the bin, not with the lengths in the direction of the slopes.

This causes much more difficulty than would be imagined. The boards wear rapidly, and the ore packs at the edge of each, impeding its movement and requiring it to be shoveled.

Several times the ore bin has been built on the slope of the hill, the sills being placed at the angle of the slope, instead of being placed horizontally on graded ground. This arrangement, while cheap, resulted in the whole ore bins slipping down the hill in wet weather, and when it was heavily loaded. The space between the ore feeder and the chutes, and below the cam-shaft platform, is often low, dark and cramped to such a degree that repairs, or even such an operation as unfastening the guides, is performed with difficulty. The result of this is that repairs, or even the adjustment of the self-feeder, is left to the last moment. In a properly constructed mill there should be sufficient room between each battery of ten-stamps and back of the feeders to the retaining wall, to conduct all repairs with celerity and comfort. In a pan-amalgamation mill this refers also to the framing and the arrangement of the shafting and gearing under the pans. All shafts, bearings and bases should be easily accessible, so that oiling and relining should be done easily. This will prevent much inconvenience and occasional accidents.

In modern mills movable pulleys on over-head tracks are rarely forgotten, and they are of great service in handling heavy castings, such as ring pan dies, millers, cones, stems, cams or mortars. Nevertheless, any blocks or elevators for lifting these from a lower to a higher level in the mill, such as from the pan room floor to the the battery floor, are forgotten in almost every instance.

Allowances are not made for future contingencies, such as the enlargement of a plant, so that when the capacity is increased it does not cause lessening of costs, as it should, owing to the poor arrangement. Sufficient space should always be reserved for these improvements, and so located that the extensions are on the same lines as the original.

A mill has been built in several instances in a depression where no outlet was possible for the tailings. This error, which must be properly charged to the superintendent, was rectified only by digging a long and expensive canal.

In brief, there are many little points which go far toward making an economical plant, and which are rarely recognized by one, save him who has had actual experience with these difficulties. More labor and intelligence are spent at the present time in producing a mill at a minimum cost than a thoroughly complete one.

**Drifts to Catch Seepage Water.**—For many years the practice at the Ontario mine, Park City, Utah, has been to run drifts in the hanging wall for no other purpose than to intercept the seepage water before it sunk below the 600-ft. level, as there it would be required to be pumped back to the tunnel level. Such procedure, particularly in "wet" mines, is saving of a considerable portion of the expense of pumping and should be more frequently used.

## DIRECT COUPLED GENERATOR AND ENGINE.

The direct coupled generator and engine, in one compact set, is, under conditions of restricted space and position, the ideal electrical plant. We illustrate a small, direct coupled generating set, recently perfected and manufactured by the General Electric Company. As perfected, it represents the result of two years of careful practical experience.

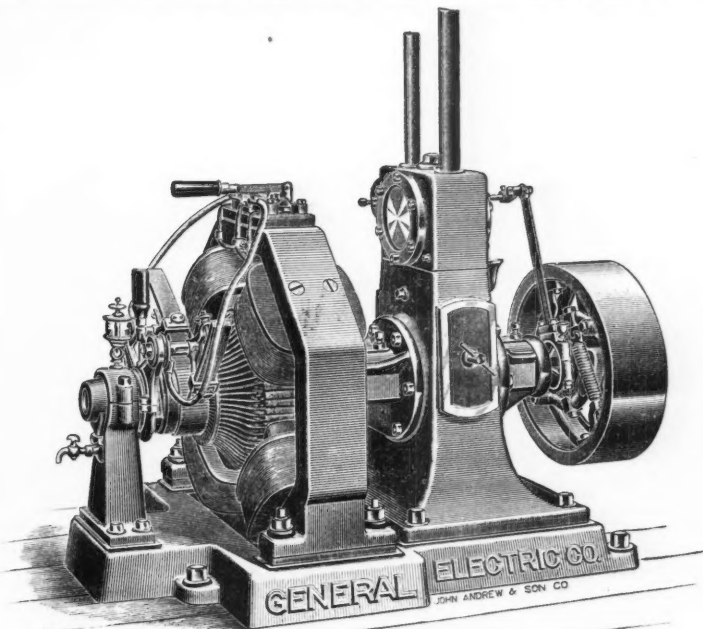
Under exhaustive tests the engine shows the highest possible economy obtainable from machines of this size, and its simplicity is such as to reduce the attention necessary to a minimum. The generator is of the familiar General Electric Company quadri-polar type, compound wound, having a regulation automatic within 2% over the entire range from no load to full load. The commutators are cross connected so that only two brushes, 90° apart, are used. The rheostat is of the new, iron frame, in-combustible type. The engine and dynamo are both provided with self-oiling bearings. The sets are manufactured in 4, 8, 15, 30 and 50 kilo-watt capacities.

## ABSTRACTS OF OFFICIAL REPORTS.

The Occidental Consolidated Mining Company.

The report of this company for the year ended Nov. 15, 1892, has been issued. It is of considerable interest as it furnishes a basis of comparison with the fraudulent returns of other Comstock companies, much to their advantage. Although no profit was made, it is safe to assume that if the Occidental Consolidated was favored by the large bodies of ore which are known to exist in many of the mines of the Comstock lode, handsome dividends would be paid. It is to be regretted, however, that a complete and detailed statement of expenditures and receipts does not accompany the report.

During the year 3,864 tons of ore was mined and worked at the company's mill. The assay value of this was \$5.90 a ton in gold, and



DIRECT COUPLED GENERATOR AND ENGINE.

\$14.33 in silver, a total of \$20.23 a ton. Concentrates and bullion were produced amounting to \$66,339.20. The yield per ton was \$5.11 in gold and \$12 in silver, being 86 3-5% of the gold and 83 8-10% of the silver.

Superintendent Kinhead's report shows that during the year prospecting work has been confined to the west ledge on the 300, 400 and 450 levels, and the main ledge on the 750 level, as well as the drift from the Sutro tunnel. The ore found in the west ledges between the 300 and 450 levels, was of fair quality, but in a narrow seam, necessitating expensive mining. The seam is well defined, and the shoot extends north and south 220 feet, and from the 300 level down to the 450.

In the north drift of the 750 level the ore shows well in bunches, and cross cuts show a large ledge of low grade ore. The most important developments of the mine have been made in the Zadig drift from the Sutro tunnel, which follows the Brunswick lode, and will eventually enter the Occidental ground at the depth of 2,000 feet on the dip of the vein. The drift is now in 1,000 feet from the main tunnel. A cross-cut from a point 600 feet south from the tunnel cut the vein, and showed it to be 127 feet in width. It contains bunches of ore too much mixed with porphyry to be fit for extraction.

Accompanying the report is one by Mr. G. Haist on the Brunswick Lode. Mr. Haist considers that the lode offers exceptional chances for prospecting ventures. He considers the outlook favorable.

**Mannocitin** is the name of a rust-preventer, which has been adopted recently at several large engineering works in Germany, such as Krupp's and Mannesmann's. It is intended for protecting the bright surfaces of iron and steel manufactures, especially when in store. It does not turn rancid, nor has it any acid in it that attacks the metal, as is the case with many greases. It also has advantages over copal and other varnish in that it never hardens, and can be removed in a few minutes with a cloth dampened with turpentine.

## THE MINES OF KITTITASS COUNTY, WASHINGTON.

Written for the Engineering and Mining Journal.

Pischatin has been known as a district that had a possible future before it ever since 1862, when placer miners discovered gold in Peschatin Creek. As many as 300 placer miners were at work at one time, but the output was small. So very little was heard of it until Sept. 1873, when Sanders and Culver found a rich streak in the vein, now known as the Culver vein. They erected an arrastra near the creek, and carried the ore to it on their backs.

Along in 1879 another pocket was discovered by John Black, from which \$60,000 was produced. This ground, now known as the Culver Mine, was subsequently jumped by W. Donahue, Tom Trout and others, who took out \$10,000. They then sold out to the Culver Co., who erected a 10 stamp mill.

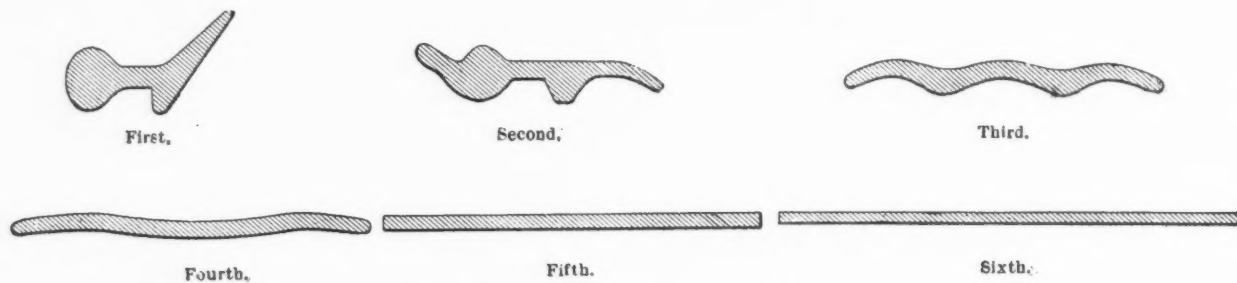
Beside owning the Culver Mine, this company owns valuable claims along the vein known as the "Bobtail," the "Humming Bird" and the "Fraction," which lie to the East. Still further East are situated the "Blackjack," "Golden Chariot" and others. Prospecting is being assiduously prosecuted, and a 40-stamp mill is now under course of erection.

The present mill has 10 stamps, and, unfortunately, was poorly constructed; beside, the mortars are so deep that the duty performed by the stamps is quite small. The mine is connected with the mill by means of a cable tramway one mile and an eighth in length.

The mines now operated and under course of development are several, but among the principal ones are the "Culver," the "Bobtail," the "Humming Bird" and the "Fraction."

The "Culver" supplies the present mill. The vein, in all probability, is a true fissure, and, although there are pinches, they are of little moment, and all due to the sliding of the hanging wall. The walls are in all probability a trachyte.

The presence of serpentine rocks also account for the presence in the ore of small quantities of chlorite and talc. The quartz also carries small quantities of galena, copper and iron pyrites. The grade of ore that goes to the mill can safely be estimated as milling on an average from \$12 to \$15 per ton in free gold. The sulphurets present from 1% to 2%, should bring the assay value of ore \$20 to \$25 per ton.



Figs. 1 to 6.—Appearance of Rail at Each Pass

McCLOUD'S ROLLING PROCESSES.

The sulphurets that are saved are of a very high grade, ranging from \$300 to \$750 per ton. They are not beneficiated at the mill, but shipped by wagon and rail to the Tacoma smelter.

The "Bobtail," "Humming Bird" and "Fraction" were purchased some months ago from W. Johnson. It is in these mines that the company is doing a great deal of development work. The vein is massive, and although the ore is not of an exceedingly high grade, quantities of it are being shown up. These mines are within easy distance of the new mill, and no difficulties present themselves to prevent the easy transportation of the ore from the mines. The ore is similar in character to the "Culver" quartz.

There is a little community of about 200 inhabitants nearby which is entirely dependent upon the mines.

Pischatin is situated in the foothills of the Cascades, Kittitass County, Washington, and lies about 32 miles north of Cle Elum, a railroad town along the line of the Northern Pacific. All the machinery for the new plant, provisions and supplies, have been freighted from this point in, at the very low rate of  $\frac{3}{4}$  of a cent per pound. Naturally the roads are bad, no attempts at road metaling having been made.

It is hoped that Pischatin will make quite a camp in the course of the incoming year. It will surely increase largely Washington's output of gold.

## SWANK MINING DISTRICT.

Placer mining has been carried along Swank Creek and its tributaries, Williams and Baker creeks, for the past 20 years, but in a desultory manner, this present year being the first that systematic operations have been carried on. Owing to the close proximity of the camp to the Northern Pacific Railroad supplies are very cheap. Unfortunately there are no large companies working, although there is a large scope of country that would pay to hydraulick. Water could be obtained from the Teanaway River. This would yield sufficient to conduct operations on a large scale. A company was incorporated in Seattle, during the month of August, having a nominal capital of \$500,000, for the purpose of constructing a bedrock flume, from the mouth of Swank Creek, which empties into the Takimo River, to the mouth of Baker Creek, which empties into the Swank, nine miles above its mouth. Although the Swank carries some gold above the mouth of Baker Creek, the ground cannot be worked to a profit. The ground through which it is proposed to carry this bedrock flume is gold bearing. Engineers have been busy during the past week making a rough survey of the creek, in order to map the recorded claims. It is pro-

posed to put on a large force of men during the early spring. Some few holes have been sunk in order to ascertain the depth of bedrock. The placer gold in Swank Creek is coarse, and quite a number of large nuggets have been discovered, the largest of which weighed something like 50 ounces, its intrinsic value being about \$720, the gold being worth about \$14 per ounce. This large piece was mined by Chinamen. John Black's big nugget was worth about \$650, while James Boxhall picked up a 33-ounce piece. Many other nuggets of size have been found, ranging from \$150 to \$400.

Up to the present year ground-slucicing and subsequent shoveling into sluice boxes has been resorted to, while considerable drifting along the bedrock has also been done.

Three small hydraulicking operations have been under way during the present season, all situated within a short distance of one another. The principal producers are situated on Swank and its tributary, Williams Creek. The best claims are the Black, which is now producing above \$3,500 a season, but two men working; one piping, the other handling boulders. This is a bar claim. The gold is coarse, one 14-ounce piece having been picked up this season. The Bigny claim, situated on Williams Creek, has yielded over \$120 per week for some time. This is a drift claim, and the channel is a problem of very great interest, for it has been discovered in this one claim only. The gold is all coarse, the pieces ranging from 50 cents up to \$75.

The Delig hydraulic claim has done very well for its owners this season. A Spokane company leased the upper bar claim of the Green Tree Mining Co., and piped for several months this season. For reasons of a financial nature they did not continue. There are two quartz propositions carried on in the district, and, although as yet there are no stamp mills, the developments in these two propositions suggest the idea that in the near future the owners will sell out to parties who will erect a mill. An offer of \$50,000 has been refused by Sweet, York and Johnson for their joint property, consisting of three claims.

James Verdar is the owner of a little property above Williams Creek that yields him from \$40 to \$50 a week by means of a small pneumatic stamp that crushes but 800 pounds during that time. This claim might bear looking into. Its whole nature reminds one very much of the "Canteras" in Callao District, Venezuela.

Many quartz prospects have been discovered this summer—30 or 40 men having been in the hills. Several of these finds are very promising

and work will be prosecuted upon them all winter. The gold output of Swank has not been phenomenal, but when it is taken into consideration that but few men have been hired, every person working for himself, it bids fair for the future of the camp. The bullion and dust extracted for the current year will foot up to something more than \$20,000. Four thousand of this must be credited to the York, Johnson and Sweet quartz claims, this amount of gold bullion having been taken out by an arrastra.

**The Occurrence of the Opal in New South Wales.**—Mr. William Anderson, in the *Records* of the Geological survey of New South Wales, describes the method of occurrence of the opal at the new mines discovered recently at White Cliffs. Inferior qualities of opal have been found in many places in New South Wales, but until the Wilcannia field was discovered some years ago, the whole of the Australian supply of precious opal was obtained from Bulla Creek, Queensland. The White Cliffs' deposit is situated about 60 miles northwest of Wilcannia. The opal is found here in a very siliceous sandstone belonging to the Upper Cretaceous. It occurs disseminated in minute fragments through the body of the work, coating the points and fractures, and occurring as definitely shaped pieces which have resulted from the replacement of fragments of fossil wood, shells, etc., or the filling of cavities which have been left vacant by decomposition. Third method of occurrence produces the most valuable specimens. Some have the form of fossil wood and others of mollusca, and both bring exceedingly high prices. The occurrence is so irregular that no shaft can be sunk, and the outcrops are carefully searched for traces of opal, and such specimens as are found are taken out by hand.

**Generator for Electric Currents of Very High Frequency.**—A dynamo has been made from the designs of Sir David Salamons and Mr. Lawrence Pyke, for the generation of alternating currents of very high frequency. This machine is intended for experiments in developing the theories and discoveries of Tesla and Crookes. A direct current of 10 ampères at 100 volts is transformed into an alternating current of one ampère at 1,000 volts, with a frequency of 1,000,000 per minute. This high frequency is obtained without an excessive speed of rotation by rotating the field and armature in opposite directions. A relative speed of 3,000 revolutions per minute is obtained by giving a speed of 1,500 revolutions per minute to each in opposite directions. It is used in connection with a transformer which increases the pressure of the current to 100,000 volts.



SOME NEW NICKEL MINERALS.\*

By Stephen H. Emmens.

In examining numerous samples of ores from the Sudbury mines in Ontario, Canada, I have met with three nickeliferous minerals which have not, so far as I know, been observed before. These minerals have been named Folgerite, Blueite and Whartonite, and appear to have a chemical constitution represented by the formulae  $NiS_2 \cdot FeS$ ;  $NiS_2 \cdot 12 F \cdot S_2$ , and  $NiS_2 \cdot 7 FeS_2$ , respectively.

Folgerite is found in the Worthington mine, about 30 miles southeast of Sudbury, in the midst of a deposit of pyrrhotite and chalcopyrite. The deposits around Sudbury are all more or less nickeliferous, and when the new mineral was first discovered it did not attract special attention, but was supposed to be millerite or some other similar mineral common in the neighborhood. However, on closer and more scientific examination its properties and characteristics were found to differ considerably from millerite. It has a metallic lustre and a greyish black streak; it is of a light bronze yellow color in the mass, but almost tin-white when it is pulverized; its hardness is 3.5; it is massive, with a platy structure; no crystals have as yet been observed; it has an irregular fracture and is very brittle; even under the microscope the powdered mineral shows no crystalline structure, and thus differs entirely from millerite; it is non-magnetic in bulk and magnetic when in grains; but when reduced to a powder it becomes non-magnetic again. When one sample was analysed the constituents were found to be: Nickel, 31.45%; iron, 31.01%, and sulphur, 37.54%; other samples gave different results, but the above was about the mean. The variations in analysis is accounted for by the difficulty in separating it from its matrix of pyrrhotite. The constituent parts of the compound  $NiFeS_2$  would be: Nickel, 32.87%; iron, 31.30%, and sulphur, 35.83%. It is probable that the formula  $NiFeS_2$  is the correct one. I named

formula,  $NiS_2 \cdot 7 FeS_2$ , gives a constitution: Nickel, 6.10%; iron, 40.68%, and sulphur, 53.22%. This will probably be the formula for the non-magnetic part, and it may be that the magnetic part is magnetite and pyrrhotite, as no nickel was found in it. The formula for this mineral has not been exactly substantiated, and possibly some alteration may be made soon. I bestowed on it the name Whartonite in honor of Mr. James Wharton, of Camden, N. J.

McCLOUD'S ROLLING PROCESSES.

Two new rolling processes have lately been invented by Mr. Sidney McCloud, and are now being introduced by the McCloud Iron and Steel Company, Chicago. The first consists in the rolling of old steel rails into plates that can be used over again, and the second in the production of "wrapped steel."

The re-rolling of the old rails is illustrated in Figs. 1 to 6, where the appearance of the rails after each successive rolling operation is shown. Hitherto in re-rolling old rails it has been the custom to slit the rail into three parts, consisting, respectively, of the head, web and base. In Mr. McCloud's process, however, no slitting is done. The rails are selected with care, and those with split ends rejected. They are then cut into two lengths of 3 to 6 ft., heated and passed through a set of specially designed rolls, which gradually flatten both the head and the flange. The rolls are grooved, so as to gradually press out sideways the extra metal in the head and base, instead of allowing it to fold over. The plates thus rolled are about 1/4 in. thick and 8 to 10 in. wide. It does not pay to treat any rails under 56 lbs. per yard in this way.

The second invention, viz., making "wrapped steel," consists in folding over a plate of steel longitudinally, by means of a special set of rolls, illustrated in Figs. 7, 8, 9, 10, 11. When this plate has been

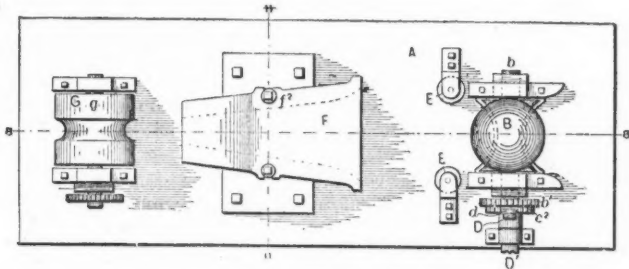


Fig. 7 - Plan View of Apparatus for Making Wrapped Steel

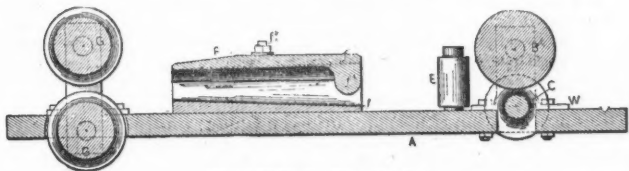


Fig. 8 - Section on Line 8-9 of Fig. 7.

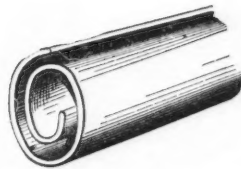


Fig. 12 - The Wrapped Steel Billet

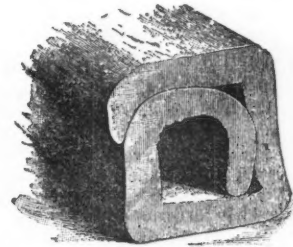


Fig. 13 - Wrapped Square Billet

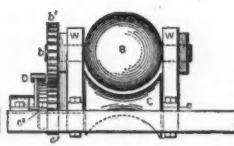


Fig. 9 - Front View on.



Fig. 10 - End View of Guide or Former.

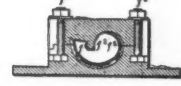


Fig. 11 - Vertical Cross Section on Line 11-11 of Fig. 7.

McCLOUD'S ROLLING PROCESSES.

the mineral Folgerite after Commodore Folger, U. S. N., in recognition of this officer's achievements in the utilization of nickel steel.

Blueite has for some time past gone by the local name of "Jack's tin." It is found in several mines in the Sudbury district, and is particularly noticeable in the working of the Emmens Metal Company, where it is associated with pyrrhotite, chalcopyrite, niccolite and gersdorffite. It is metallic in lustre and has a silky appearance, and its color is pale olive-grey, inclining to bronze; its specific gravity is 4.2, and its hardness is 3 to 3.5; it has a black streak; its form is massive, and no crystals have yet been seen; it has a subconchoidal irregular fracture and is brittle; it is non-magnetic; under the lens the powdered mineral appears to be composed of irregular grains of a dull grey color; and under the microscope the color is a dull greyish black, and the particles do not show any crystalline structure. On analysis of a specimen, freed from gangue, the composition was found to be: Nickel, 3.70%; iron, 41.01%, and sulphur, 55.29%. Probably the figure for sulphur is too high, as a portion of it may have entered into solution. The formula  $FeS_2 \cdot NiS_2$  gives a percentage composition: Nickel, 3.76%; iron, 42.96%, and sulphur, 53.28%, so that no doubt this is the correct formula for the mineral. I gave it the name Blueite after Mr. Archibald Blue, director of the Bureau of Mines of the Province of Ontario.

Whartonite was first found in a mine about seven miles northeast of Sudbury. It has a metallic lustre and its color is bronze-yellow; it has a black streak; its form is cellular, the cavities being lined with minute cubic crystals and the intermediate substance being finely granular; the specific gravity of a large piece was found to be 3.73 and its hardness 4; it has an irregular fracture and is brittle; on comminution about 10% of the mineral was found to be magnetic; under the lens and microscope the powdered mineral is seen to consist of greyish black grains of irregular form and finely granular structure, with occasional minute cubic crystals. After the deduction of insoluble matter, the chemical constitution is: Nickel, 5.79%; iron, 45.98%, and sulphur, 48.23%. The

folded into the shape shown in Fig. 12, it is called a "wrapped steel billet," and then it is squared into the shape in Fig. 13. It is subsequently treated in the same way as steel billets in making flat bars, hoops, etc. A bar or hoop made in this way is composed of a number of folded layers, closely pressed together, but not welded together; the seams are hardly perceptible to the eye, and the layers can only be separated by very great force. Such a bar or hoop has a much longer life, on account of the number of successive skins. In the case of solid steel the rupture of the skin is fatal, whereas, with wrapped steel, if the outer layer is broken the inner layers are still intact and can resist further strain.

In making the wrapped steel billet the flat plate is first fed between the rollers B C, which curve it into the shape of a semi-cylinder. Then after being laterally compressed by the rolls E, it passes through the former F, on emerging from which its cross section has the shape of one convolution of a spiral. Afterward it is passed through the final rolls, G, which compress the convolution into the shape shown in Fig. 12.

The rolls B and C are geared together by the gear wheels  $b_1 c_1$  and the shaft of C also has a ratchet wheel,  $C_2$ , on it, which is driven by the pawl d on the arm D. The arm D is keyed to the end of the driving shaft  $D'$ , which is separate from the shaft of the roll C. The purpose of thus driving the rolls C and B by means of the ratchet wheel and pawl, is to permit the rolls B and C to move faster than the driving shaft,  $D'$ , in case the final reducing rolls G draw the metal plate forward at a speed greater than that of the rolls B and C.

The former F consists of two parts, f and  $f_1$ , bolted together at  $f_2$ . The lower part f has a concavity in it, which is broad at the mouth and tapers gradually toward the end. The upper part,  $f_1$ , is partly concave, but has a rib,  $f_3$ , along the middle, which is broad at the front and tapers to a narrow point at the end. The two longitudinal cavities,  $f_4, f_5$ , into which the rib divides the concavity, receive the two edges of the plate, and their shape gradually folds one edge over to the line of the other. After emerging in this folded condition, the plate goes to the rolls G, in whose peripheries are the grooves g. Here they are, as has already been stated, reduced to the shape shown in Fig. 12.

\* Abstract of an article in the Journal of the American Chemical Society.

## THE GOLD DEPOSIT AT PINE HILL, CALIFORNIA.\*

By Waldemar Lindgren.

The gold deposit at Pine Hill, in Nevada County, Cal., differs entirely from the usual type of primary gold deposits in California. Briefly speaking, it consists of veins and seams of barite, carrying gold and silver, distributed through a kaolinized zone in diabase and diabase-porphyrite. Pine Hill is a little knoll in the lower rolling foot-hills of the Sierra. Toward the south and west a large area extends, occupied by massive diabases and diabase-porphyrites, in which auriferous veins are seldom seen. To the east there is an area of complicated quartzes and clay slates, serpentines and gabbros, sometimes dynamically metamorphosed and containing a few veins of gold quartz of irregular gold constituent. To the northwest there is a large area of granite, diorite and gabbro, with very few auriferous deposits. The diabase and diabase-porphyrite, which form the prevailing rock of the district, are massive, fine-grained and somewhat affected by secondary processes, which give rise to urallite, chlorite, secondary quartz, etc. The diabase-porphyrites appear to prevail along the crest of the ridge of which Pine Hill forms the culminating point. Surrounding the Hill there is an area of intense decomposition, approximately one mile long and from 1,000 to 2,000 feet wide. Within this area the rocks are converted to a soft, porous, reddish-brown to yellow mass, from which calcium magnesium iron and the alkaline metals and some silica have been removed; this product of decomposition has been acted on in some places by thermal waters, alkaline in character with the production of a soft, white, and nearly pure kaolin or hydrated silicate of alumina. In many places the zone of kaolinized diabase is impregnated with irregular veins and seams of barite, with which gold and silver are closely connected. The deposit has been worked, but at present operations are at a standstill. The ore on the dump outside one of the shafts is composed largely of barite mixed with limonite and decomposed country rock. No sulphurets are to be seen, but a few stains of sulphate of copper are noticeable. The assays in general show a large amount of silver relative to gold, more than is usual in gold quartz veins. The proportion of gold to silver by weight varies from 1:1 down to 1:5, or in value from 20:1 to 4:1. Only a part of the silver is alloyed with the gold, the other part existing as chloride.

## OBSERVATIO -TUNGSTEN.†

By William H. Wahl.

In the course of an investigation carried on during the past two years by the writer, in conjunction with Dr. William H. Greene, with the object in view of producing pure ferro-alloys, we made a number of experiments with ferro-tungsten.

These tungsten alloys exhibited similar physical properties possessing considerable hardness and toughness, an extremely fine crystalline texture, with a fracture resembling that of tool-steel, and a specific gravity ranging between 9.3 and 10.14.

Some of the fractures, however, exhibited the fact that the alloy was not entirely homogeneous, disclosing under the glass and in places to the eye, the presence of what are apparently smooth cleavages of imperfect crystals scattered through the finely-crystalline matrix of the alloy.

A sample of the alloy of 10.14 specific gravity was analyzed at my suggestion, by Mr. J. F. de Benneville in the laboratory of Dr. Genth. The result of the analysis exhibited a very high percentage of tungsten in the sample, and its behavior toward liquid and fused solvents proved the interesting fact that a large proportion of the tungsten was present in the uncombined condition, as metallic tungsten, crystallized in the matrix of the alloy. The facts upon which Mr. de Benneville has founded this observation will appear in the following extract from a letter describing briefly the method pursued in his analytical work.

"Aqua regia attacked it, although not energetically, and by decanting and adding fresh portions of acid from time to time a residue was obtained which resisted further action by acids, or by fusion with  $\text{Na}_2\text{CO}_3$  and  $\text{KNO}_3$ . It was a heavy, black, pulverulent substance, and in its negative action toward solvents answered to tungsten, which I took it to be. It gave 22.54% of the original material. A second portion of the material (powdered in a steel mortar) was fused with a mixture of  $\text{Na}_2\text{CO}_3$  and  $\text{KNO}_3$ , lixiviated and the residue weighed. This was fused again and the residue weighed, the second weighing being practically the same, yielding 22.80% of the original material. Using strong HCl (1.20 sp. gr.) in successive portions, decanting, igniting the residue and treating again with acid, gave me 21.74%."

The foregoing extract appears fully to justify the conclusion that the undissolved residue represents the metallic tungsten present in the alloy in the uncombined state.

The composition of the metal analyzed by Mr. de Benneville is as follows:

Per cent.		Per cent.		Per cent.	
C.....	0.85	Mn.....	trace	W (alloy).....	34.35
P.....	0.041	Fe.....	42.28		
Si.....	0.14	W (metal).....	22.54		100.201

A study of these figures reveals another interesting fact to which I desire to call your attention.

Taking the figures of the iron and combined tungsten (42.28 : 34.35) and calculating the percentage of tungsten which this ratio represents, we obtain 44.82 per cent. tungsten. A calculation shows also that the figures representing the compound  $\text{Fe}_4\text{W}$  are almost identical with the ratio above-named, to wit:

$\text{Fe}_4\text{W}$ , Found.	$\text{Fe}_4\text{W}$ , By theory.	Difference.
Fe, 55.18 per cent.	Fe, 54.91 per cent.	
W, 44.82 per cent.	W, 45.09 per cent.	- 0.27
100.00	100.00	

The conclusion would seem to be justified by the facts above noted,

\* Abstract of an article in the *American Journal of Science*.

† From Proc. Chem. Sect., Franklin Inst., meeting of November 15th, 1892.

that the saturation point of iron for tungsten is represented by the ratio exhibited in the compound  $\text{Fe}_4\text{W}$ , and that any excess of tungsten, above this ratio, present in a tungsten iron, will remain uncombined.

I wish to express this statement as probably the correct interpretation of the facts, for it is hazardous to make a generalization of this kind on the results of a single analysis.

It may be interesting to note in conclusion that Howe, in his "Metallurgy of Steel," refers to several cases of ferro-tungsten indicating the composition  $\text{Fe}_4\text{W}$ , and that the works on metallurgy, as a rule, accept without question the dictum that iron and tungsten will unite in all proportions. In the light of the facts given in this paper, this last statement requires qualification.

## THE ANALYSIS OF TIN AND TERNE PLATE.\*

R. B. Carnahan.

In determining the tin in tin and terne plate by the stannic oxide method, it is difficult to completely separate the stannic oxide, and even if this is accomplished, the precipitate is sure to contain a considerable quantity of ferric oxide, and small amounts of lead and manganese oxides. It is possible to purify the stannic oxide by fusion, but such a process is slow and troublesome. I have, therefore, given some time to devising a more rapid and satisfactory method, and the method here given is the result of my investigation.

To ascertain the tin constituent dissolve 5 grammes of tin or terne plate in 100cc. of hydrochloric acid (sp. gr. 1.1), contained in a 500cc. flask, with exclusion of air. When all is dissolved, cool, and fill up with water to make 500cc. Transfer 50cc. to a beaker and after adding starch paste, titrate the tin with a standard iodine solution. A convenient strength of iodine is made by dissolving 5.38 grammes of pure iodine in strong potassium iodide solution and diluting to 1 litre.

For the iron determination, add mercuric chloride in excess to 50cc. of the solution and titrate the iron with standard bichromate.

The determination of manganese in the solution is important, as it shows whether the plate is of iron or steel. The colorimetric method usually employed fails when applied to tinplate, and so the following method is used instead. Treat 4 grammes of tinplate, after being finely divided, with hot dilute sulphuric acid for about fifteen minutes. When the iron has dissolved, leaving the layers of tin and lead, add a little zinc and let it stand for about two minutes. Then filter and dilute to 20cc. Take half of this filtrate, add 5cc. of nitric acid (1.2 sp. gr.), and treat in the ordinary way with lead peroxide.

The lead in tinplate is best determined as sulphate after first separating the tin by nitric acid. For ordinary work, however, it is sufficiently accurate to take the lead by difference after allowing 0.25% for phosphorus, carbon, sulphur, silicon, etc.

The iodine method may be used for determining tin in all alloys which contain no metals that affect iodine. If, however, the percentage of tin exceeds 10%, as in the case of solder, I prefer the following method, which is simply a reversion of the well known stannous chloride titration method for iron. It is not quite so simple or rapid a method as the former, but it is rather more accurate. Dissolve 5 grammes of the tin alloy in strong hydrochloric acid, contained in a 500cc. flask, and after diluting to 500cc. fill a 50cc. burette with some of the solution. Transfer 10cc. of a standard ferric chloride solution (10 grammes of iron in 1 litre), to a four ounce flask, and heat to boiling. While boiling run the tin alloy solution cautiously into the ferric chloride until the yellow color disappears. Cool and determine the excess of stannous chloride with standard iodine solution. This reaction is represented by the equation  $\text{Fe}_2\text{Cl}_6 + \text{SnCl}_2 = 2\text{FeCl}_3 + \text{SnCl}_4$ . Knowing by the equation that 56 parts of iron equal 59 parts of tin and adding to this the slight amount of tin by iodine titration, and at the same time knowing the volume of tin alloy solution used, we can readily calculate the tin.

**Testing New Coast Lights.**—Two interesting experiments were made on the night of the 21st inst. at the experimental station of the Light-house Board at Tompkinsville, S. I., by Maj. David P. Heap and Capt. W. S. Schley. One was with a new light, to be placed on Hallet's Point, in Hell Gate, on December 31st. It shows a white and a red flash of three seconds' duration each. A simple mechanism at the bottom of the case containing the light causes the glass to revolve about the light. The old light at Hallet's Point was found to be too bright, and blinded pilots so that they could not tell their surroundings. A variegated light like the one tried is necessary in order to distinguish the signal light from the multitude of white lights all about the locality. The apparatus worked satisfactorily. The other experiment was with a more complex contrivance, the invention of a German named Schirm. The machinery was made by Siemens & Halske, Berlin. It is arranged to show a flash light at intervals. It was tried on this occasion for the first time in this country. Wires are arranged running from two cells of a Leclanché battery to a clock and to the apparatus immediately connected with the light. From the clockwork projects an axis carrying a wheel fitted with projections, which, striking against a spring, make an electrical contact, and cause the current to reach the light apparatus. The projections placed at different intervals cause the flashes with corresponding irregularity. When the contact is made, a little puff of naphtha vapor is sent from a bellows into a small flame that is kept burning continually. This vapor passes through a box containing powdered magnesium, and carries particles of the powder into the flame. It there takes fire, and blazes up with a blinding white flash. The apparatus worked well, but Major Heap indicated some defects in it. The smoke from the magnesium was always dimming the glass about the light; the machinery was intricate and likely to get out of repair, and the machine gave a short flash at long intervals, while the idea of a mariner's light should be a long flash at short intervals.

\* Paper read before the Chemical Section of the Engineer's Society of Western Pennsylvania.

## THE STIRLING WATER TUBE BOILER.

The Stirling water tube boiler, which we here illustrate, has achieved considerable success since its introduction about the beginning of this year, and the best evidence that it bears out the maker's promises in practice is that several second orders have been received from the early purchasers. The main feature of the boiler is that it can be worked safely at high pressures. The boiler consists of three upper steam drums, each 36 in. in diameter and one lower mud drum 42 in. in diameter. Expanded into these drums are 3½ in. tubes, which are so bent as to enter the drums at a proper radius, and to allow for any unequal expansion or contraction. The water is fed into the rear upper drum, and during its passage to the mud drum it becomes heated to a temperature over 300 degrees, at which temperature the lime, magnesia and other impurities are separated from the feed water and are deposited in the comparatively cool mud drum whence they are easily blown off. As a result, the two front banks of tubes are filled with chemically pure water and do not scale. This, it is claimed, is not theory, but fact, as is shown in many instances where any other boiler required thorough cleaning every week, the Stirling would run six to eight weeks without being opened up for cleaning. There are no cast metal parts in the boiler construction. In one end of each drum is a 16 in. manhole, faced elliptically, against which a manhole plate is fitted and held in place by wrought steel bolts and arches.

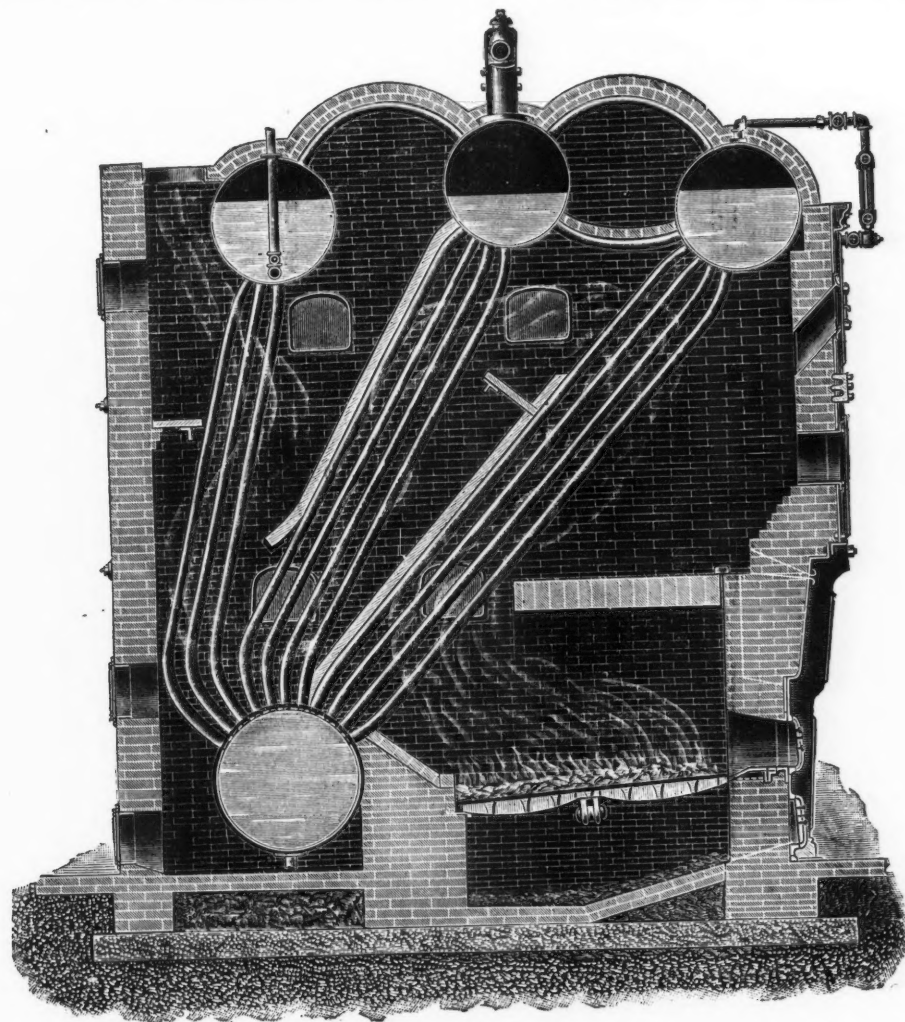
4. The kind of mineral must be made to appear in the application. Case where several parties made mineral entry (1503) at Helena, Mont., of mineral claim—Lot. No. 42—known as "Placer Mining Claim," embracing 132.05 acres.—*Houghton vs. McDermott et al.*—[Secretary's decision affirming that of Comr. Gen. Land Office, Nov. 29th, 1892.]

## COAL LAND—HOMESTEAD ENTRY CONTEST—SURFACE INDICATIONS.

1. On issue joined as to the character of land alleged to be more valuable for coal than for agricultural purposes, it is incumbent upon the plaintiff to show the existence of a coal deposit sufficiently valuable to be worked as a mine.
  2. Before final certificate issues, a homestead entry is open to attack on the ground that the land embraced therein is mineral in character, without regard to the date of the alleged mineral discovery.
  3. The circumstances that there are surface indications of the existence of veins of coal does not constitute a mine. It does not even prove that the land will ever be under any conditions sufficiently valuable on account of its coal deposits to be worked as a mine.
- Case involving land in Olympia Land District, Washington.—*Jones vs. Driver.*—[Secretary's Decision, Dec. 2d, 1892.]

## MINING CLAIM—PRACTICE—SURVEY—ADJUSTMENT.

1. When separate applications for a patent are made on contiguous lo-



THE STIRLING WATER TUBE BOILER.

The removal of these four manhole plates gives access to every tube in the boiler, and the drums are amply large for a man to work inside them conveniently.

## DIGEST OF RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Secretary of the Interior.

## MINING CLAIMS—PROTEST—CHARACTER OF LAND—APPLICATIONS FOR PATENT, ETC.

1. A protestant against a mineral entry who alleges the land to be agricultural land in its character, is not entitled to an order for a hearing in the absence of specific showing that the land in question was in fact agricultural at the date of application for a mineral patent, when the record discloses that the mineral applicant made the requisite showing as to the character of said land.

2. The applicant for a mineral patent must show compliance with the terms of the mineral law when he files his application for a patent. [Vide Sec. 2,325].

3. If no adverse claim to an application for patent be filed during the period of publication prescribed by the U. S. Stats., it shall be assumed that the applicant is entitled to a patent. This assumption is based upon the fact that the applicant had complied with the requirements of the law at the date of his application, and that nothing further is required of him.

ocations, notice given accordingly, and separate surveys of the several locations made, but one set, only, of field notes, the survey being treated as for a consolidated claim.

2. The entry man may, in the absence of adverse claims, file a new application, embracing the several locations as a single claim, and make entry thereof *in rem pro tunc*, with a view to the subsequent equitable confirmation of such entry.—*Appeal from Commissioner's decision in re Frederick A. Williams requiring him as claimant of the "New Fisherman," "New River Bend," "New Washington City," and "New Boston" placer claims at Montrose land office, Colorado. Modified.* [Secretary's Decision, Dec. 5th, 1892.]

**Portland Cement for Steam Joints.**—In our issue of November 12th we stated that a German inventor had devised a method of using Portland cement instead of rubber and asbestos preparations in the manufacture of steam joints. Mr. Walter J. Wood, of Grimsby, England, in a communication on this subject, states that he used Portland cement for this purpose seven years ago and continuously since. He also characterizes the German inventor's method as expensive and tedious, for, in his experience, if the cement is good and a little soda is added to it, all that is necessary is to cover the joint with it, nip up the bolts, and thirty minutes afterwards either steam or water may be admitted. If the cement does not show signs of setting within a few minutes after application, it should be rejected.

## PERSONALS.

Mr. Henry Bratnober, of Montana, was present at the late monetary conference in Brussels.

Mr. James Heron, Cloverport, Ky., has been appointed General Superintendent of the Lexington & Carter Mining Company, Carter County, Kentucky.

Dr. Alexander Trippel, of Globe, Ariz., has been proposed for surveyor general of the territory by various newspapers, notably by the Globe "Silver Belt."

Mr. W. C. Anderson, of Philadelphia, Pa., recently treasurer of the Lehigh Valley Railroad Company, has been elected treasurer of the Thomas Iron Company, of Hokendauqua, Pa.

Mr. Courtenay de Kalb, mining engineer, has just returned to New York from a visit to the Principulca District, Nicaragua, Central America, where he went on August last to examine gold mines for capitalists in this city.

Mr. Otis H. Childs, assistant to Chairman H. C. Frick in the armor plate department of the Homestead, Pa., Steel Works, has resigned his position, and Millard Hunsiker, engineer of tests, has been appointed to the vacancy.

Mr. Frederick H. Lewis has resigned his position as manager at Philadelphia, Pa., of the Pittsburgh Testing Laboratory, and will be connected with Booth, Garrett & Blair, of Philadelphia, Pa., who are about to organize a new department of mechanical testing and inspection.

Mr. William Murray, formerly chemist for the West Duluth Furnace Company, West Duluth, Minn., has been appointed chief chemist at the Edgar Thomson Steel Works, to take the place made vacant by the retirement of S. A. Ford some months since. Mr. Murray took charge of the laboratory at Braddock, Pa., this week.

Senator Tabor's paper, the Denver Colo., "Stock Exchange Journal," a consistent foster-mother of wildcats, does the Engineering and Mining Journal the honor of its hatred, and exhausts its vocabulary of billingsgate in denouncing us. We sincerely hope it will change neither its opinion nor its language. Its good esteem or praises would be as abhorrent as the caresses of a snake.

## OBITUARY.

Henry B. Gould died at Buffalo, N. Y., on the 16th inst. He was vice-president of the Gould Car Coupler Company.

William James, a pioneer miner, aged 57 years, proprietor of the Cambridge Coal Company colliery, died at Shenandoah, Pa., on the 21st inst.

A. W. Barrows, secretary of the Union Consolidated Mining Company and other mining companies, died in San Francisco, Cal., on the 11th inst.

James Ludlam, president of the Pompton Iron and Steel Works, died at Pompton, N. J., on the 20th inst., aged 64 years. He established the steel and car spring industry of Pompton, and was interested in other manufacturing ventures.

Livingston L. Baker, senior member of the firm of Baker & Hamilton, manufacturers of agricultural implements, died in San Francisco, Cal., on the 21st inst. He was born in Portland, Me., in 1827 and went to California in 1849. After prospecting in the mines for a time he engaged in the hardware business in Sacramento with Robert M. Hamilton. Mr. Baker was otherwise prominent in business circles. His estate is valued at \$1,500,000.

Edward H. Miller, Jr., first secretary of the Central Pacific Railroad, and former business partner of the late Mark Hopkins, died at Alameda, Cal., on the 20th inst. He was born at Greenville, N. Y., in 1825, and went to California in 1849. He is credited with having organized the entire accounting and financial system of the Central Pacific, and when the Southern Pacific Company of Kentucky was organized Mr. Miller became secretary of that road, and remained so until three years ago, when he resigned. He continued as a director of both companies, and was also in the directorate of the Crocker-Woolworth Bank of San Francisco. He leaves a large estate.

Col. Jules Berton, for some years French consul at Sacramento, Cal., and also business agent for French investors in Pacific coast mines, died in San Francisco on Friday, the 9th inst. The deceased in early years won some reputation in France while connected with the "Journal des Debats," and still maintained a correspondence with London and Paris journals after taking up his residence in California. He made an extensive report on the mines of the Pacific coast and their output to the French government some years ago, since which time he has been more or less directly identi-

fied with mining interests. Colonel Berton had for some time suffered from locomotor ataxia, and finally succumbed to the disease. He was 68 years of age and leaves a widow.

## SOCIETIES.

Geological Society of America.—The sessions of this fifth winter meeting of the society will, by invitation of the Logan Club of the Canadian Geological Survey and the Royal Society of Canada, be held in Ottawa, in the House of Commons building. The society will be called to order at 10 o'clock a. m., Wednesday, December 29th, 1892. The headquarters will be at the Russell House. Mr. W. H. C. Smith, Geological Survey Department, will attend to the wishes of the Fellows in the matter of securing rooms. Matter for the program distributed at the first session, Wednesday morning, should be in the hands of the secretary by Tuesday noon. Until December 22nd the address of the secretary will be as usual; after that date at the Russell House, Ottawa, Can. Provision will be made for lantern illustrations. Papers have already been offered by the following persons: A. R. C. Selwyn, Sir J. W. Dawson, G. M. Dawson, J. F. Whiteaves, R. W. Ellis, J. B. Tyrrell, A. D. Barlow, H. M. Ami, H. P. Brumell, A. P. Low, R. Chalmers, Robert Bell, W. H. C. Smith, E. D. Ingall, J. McEvoy, of Canada; H. F. Reid, of Cleveland, and Warren Upham. On Wednesday evening an illustrated lecture will be given in the Normal School Auditorium, which will be followed by an informal reception. On Thursday evening the Fellows of the Society are invited to join with the members of the Logan Club in their Annual dinner. This will be at the Russell House at 8 o'clock.

## INDUSTRIAL NOTES.

The Betts Machine Company, of Wilmington, Del., employing about 90 men, announced a reduction of from 16 to 17% in wages on the 20th inst., owing to the dullness of trade.

Messrs. Rogers & Clement finished their contract on the Niagara tunnel on the 16th inst. It called for the construction of 6,700 ft., and this length of the big tail race is completed.

Captain John A. Schweers, chief of the Reading Coal and Iron Company's pay-roll department at Pottsville, Pa., has been appointed to represent that company in its endeavor to establish a market for its coal in Germany. He will shortly sail for Berlin.

The issue of an order reducing the wages of the molders in the employ of the Phoenix Iron Works, of Baltimore, Md., resulted in a strike on the 19th inst., in which 50 men participated. The reduction meant about \$2 per week, which amount, the firm claim, was in excess of the prices paid by competing firms.

The bids for the construction of the 20-ft. channel from Chicago to Buffalo and Duluth are rapidly coming in. Those for section 8, comprising the work at the mouth of the Detroit river, and section 2, for the excavation of 380,000 cubic yards in Mud Lake were opened December 15. The lowest and highest bidders respectively were L. P. & J. A. Smith, of Cleveland, at 18 cents, and C. E. Mitchell & Co., of Ludington, at 29.9 cents.

A dispatch from Minersville, Pa., states that it is understood there that the transfer of the Pardee estate interest in the Minersville Iron Works to the Philadelphia & Reading Company has been finally consummated. It is the intention of the company to turn the establishment into a car repair shop to relieve the strain on the shops at Reading, Schuylkill Haven and Palo Alto, and to have the repair work accomplished in the vicinity of the collieries.

The blast furnace of the Bellaire (O.) Nail Works has a 16-ft. bosh and is 75 ft. high. Recently it made 278 tons of No. 1 Bessemer iron in one day. During November the Bessemer plant turned out 10,418 tons of ingots. The blast furnace and steel plant have been in constant operation for some months past, but the steel plant will be closed down for about 10 days at the close of the year for the usual annual repairs.

The proprietors of the "Suburban Gazette," Jersey City, N. J., desire to secure for publication and distribution as premiums a number of practical building plans and specifications. With this object they now offer 100 cash prizes, aggregating nearly \$11,000, for the best designs for suburban cottages, stables, mantels, etc. The rules governing the competition for the prizes may be had by applying for a copy of them to the publishers of the "Suburban Gazette."

The Joseph Dixon Crucible Company, of Jersey City, Manufacturers of Dixon's "American Graphite" pencils, are putting a fifth story, 175x75 ft. on their pencil factory. The new addition will be equipped with new and improved pencil machinery of their own invention. Besides this large addition to their pencil factory the company will establish a rubber and brass plant for the manufacture of the various pencil accessories and novelties.

The Hainsworth Steel Company, of Pittsburg, Pa., was taken out of the hands of the receiver on the 21st inst. by an order made by Judge Buffington, of the United States Court, and the reorganized company will at once take hold. The receivers were appointed October 24th, 1891, at which time the liabilities were close to \$400,000, of which the greater portion was due the Oliver & Roberts Wire Company and the Oliver Iron and Steel Company. The new company will be composed of the members of the old company and creditors, to whom preferred stock will be issued to the amount of about \$111,000. All the creditors have agreed to this except claims amounting to about \$4,000, and these will be paid in cash, as well as the mortgage indebtedness of \$59,615.

The Lidgerwood Manufacturing Company, New York, has recently established a branch office at 505 Main St., Louisville, Ky., which will be in charge of Mr. Samuel Avery as sales agent. Mr. Avery was formerly president of B. F. Avery & Sons' Plow Works, and has a wide acquaintance throughout the territory (Kentucky and Tennessee) in which he will represent the Lidgerwood company. Messrs. James Macbeth & Co., of New York, have made a number of improvements in their factory at Jamaica, L. I., adding an extra boiler to the power plant and erecting several new buildings, which will give them greater facilities and put them in the best possible shape for the new year. They will hereafter make the insulating compound used in the manufacture of their electrical fuses, etc., and one of the new buildings lately erected will be used for that purpose.

Messrs. Ricketts & Banks, metallurgists, chemists and mining engineers, of 104 John St., New York, have been authorized by Vivian & Sons, of Swansea, Wales, to purchase ores and furnace products in the United States. The prices paid under this arrangement will be based as follows: For copper, the price of best selected copper, as quoted by the Lombard Metal Exchange, London. For silver, the price of bar silver per standard ounce in London, as quoted in "Bullion Price Current" of Messrs. Sharp & Wilkins. The copper to be determined by electrolytic assay and full contents to be paid for; silver and gold to be determined by the usual commercial assay; nothing less than a full ounce of silver per ton of 2,240 lbs. to be returned in assay or paid for, and nothing less than a full tenth of an ounce of gold per ton of 2,240 lbs. to be returned in assay or paid for. Gold contents will not be allowed when less than three-tenths of an ounce per ton of 2,240 lbs.

One of the most costly pieces of property in the United States now lying idle is probably the great railroad bridge over the Pecos river, 200 miles west of San Antonio. This bridge, which is said to be the second highest in the world, was completed six months ago at a cost of \$1,200,000. It was built by a private corporation for the use of the Southern Pacific Company. In addition to this bridge a railroad track leading to it was built, shortening the distance between San Antonio and El Paso by 11 miles. After the bridge and cut-off railroad had been completed they were visited by President C. P. Huntington, and a number of other prominent officials of the Southern Pacific Company and the new property was formally accepted. In a short time a new timetable was issued by the Southern Pacific, embracing the new cut-off and the Pecos bridge. Tickets were issued for that road via Southern Pacific and the Pecos bridge, a fare of 50 cents being charged every passenger over the new bridge. After all this had been arranged trains were started running over the new route, and the announcement was made that the track of the old route through the dangerous canyons of the Rio Grande river was to be taken up. But trains had been running over the new Pecos bridge only two weeks when the order came from President Huntington to abandon the new bridge and cut-off track and immediately resume traffic via the old route. Since that time not a train has crossed the new bridge. There is much speculation in railroad circles as to the cause of this sudden and wholly unexpected action on the part of President Huntington. The solution given by some is that President Huntington is a small stockholder in the company which owns the bridge, and that, after giving the new route a two weeks' trial, he became convinced that it was valuable property. He then started to freeze out the remaining stockholders by abandoning the bridge, which is of no value whatever if not used by the Southern Pacific Railroad.

## MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at this office.

No charge will be made for these services. We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts

of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the Engineering and Mining Journal are not brokers or exporters, nor have they any pecuniary interest in buying or selling of goods of any kind.

#### Goods Wanted at Home.

- 2,848. Good second-hand steel rails. Texas.  
 2,849. 240 kegs track spikes 5 in. x 1/2 in. Alabama.  
 2,850. Wheat threshing machine with engine. Georgia.  
 2,851. Coke crushing machinery that will turn out different sizes to correspond with those of anthracite coal, the capacity to be 2 or 3 cars daily. Maryland.  
 2,852. A gymnasium outfit for a small town. South Carolina.  
 2,853. A second-hand typewriter. South Carolina.  
 2,854. A plant for washing, rinsing and roasting phosphate rock. Florida.  
 2,855. 500 tons 35-lb. T steel rails, or 550 tons good 40-lb. iron; also straight plates, bolts and spikes to lay the same. Georgia.  
 2,856. A good second-hand 26 or 30-ton standard gauge 4 to 8 1/2 ft. engine. Georgia.  
 2,857. A good second-hand combination coach. Georgia.  
 2,858. A second-hand 20-ton hand-power crane. Pennsylvania.  
 2,859. A second-hand 500 to 800-lb. power or steam hammer. Pennsylvania.  
 2,860. A second-hand drill press. Pennsylvania.

#### GENERAL MINING NEWS.

##### ALABAMA.

The Jefferson Steel Company made their first run of open hearth steel last week. This company a few months ago purchased the old Henderson works, and have expended a large sum of money in putting in a new plant.

##### ALASKA.

Alaska Mexican Gold Mining Company.—The Exploration Company of London is offering for sale on that market 40,000 shares of this company at £1 2s. per share. The total capitalization is \$1,000,000, divided into 200,000 shares at \$5 each. Of these shares, 120,000 are held by former owners of the property, while 80,000 shares are available for raising working capital. The president of the company is Wm. Alvord, of the Bank of California, and the directors are Col. J. D. Frey, Mr. E. W. Hopkins and Mr. Edgar Mills, all of San Francisco. This company owns the Alaska-Mexican Gold Mine, which is a continuation of the Alaska Treadwell. It also owns water rights and mill sites. The mine is developed by an adit tunnel and drifts for a length of 3,000 ft. and a depth of 150 ft. The ore developed varies in width from a few feet to 100 ft. The average thickness appears to be 35 ft. Assays vary from a trace to \$5.75 of gold. A trial crushing of 450 tons, at the Alaska Treadwell Mill, yielded \$7 per ton. In the opinion of Mr. H. C. Perkins and Capt. Thomas Mein, the property warrants the erection of a 60-stamp mill.

##### ARIZONA.

The Mojave "Miner," of Kingman, Ariz., in its issue of December 10th, has this to say of the new gold fields on the San Juan river to which a rush has been made: Some three months ago, it is alleged, John Williams, an Indian trader, made a discovery of gold placers on the San Juan river, near its mouth. He circulated the news of this discovery, and in a few weeks nearly 300 claims were staked. A company of railroad men sent the locators in to do the work. These same men put in their time since the location of the placers, until about two weeks ago, in locating quartz ledges, and, in fact, everything showing a stain of mineral. Now they give out wonderful stories of fabulous pockets of gold and other minerals in that snowclad region. This, in the face of the fact that no work has yet been done on the placer (?) claims, is ridiculous. The first hard work a prospector would do would be to go to work on a placer claim, and not run around the country locating "broncho" ledges and receiving a salary of \$3.50 per day therefor. That the Navajo reservation and the country along the San Juan River has been prospected for years is a fact well known to all the old-timers in this country, and that it falls short of being a mineral section is also well known. Of course there is some placer ground on the river, but it is too poor to work profitably. The San Juan country is now covered with snow, and the people who have just gone in there will suffer untold hardships before they can get back to civilization.

(From our Special Correspondent.)

The reports which have been coming in from the newly discovered placer grounds on the San Juan river, in Southern Utah, have resulted in an exodus of miners from the various camps throughout the territories. Large numbers of men have left San Francisco, also, for the new Eldorado. The placer diggings are situated 40 miles north of the Arizona boundary, the nearest point of departure from the Atlantic & Pacific Railroad being Holbrook. At least 1,000 men are now on the ground or pushing across the desert as fast as teams can

carry them. Reports vary as to the value of the dirt, but it is generally agreed that it is very rich. The claims already located lie in a deep cañon, lying much below the surface of the surrounding country, and at present there is but one trail by which goods can be packed into camp. Freight is being hauled for 10 cents per pound, and \$35 is being charged for the privilege of riding on a lumber wagon. Some discredit, however, is thrown on the new diggings by the mode of being exploited by the original discoverers. An Indian trader was the first to discover the ground about three months ago, and within a few weeks 300 claims were staked off. A company of railroad men sent the locators in to do the work. These men have, since that time, been engaged in locating quartz ledges, and, in fact, everything bearing mineral stain. Now they are giving out stories of fabulous pockets of gold and other minerals in the snow clad regions; and this in face of the fact that no work has yet been done. These original locators have staked off 147 claims and transferred 51% of each claim to the Gable Mining Company, the stockholders of which organization are in many cases men of position. This company profess to be ready to expend a quarter of a million dollars in preliminary work in placing machinery, erecting dams, etc. Meantime the reports received must be discounted for the Navajo reservation and the country along the San Juan river has been prospected for years and has always been regarded as a poor mineral country. The excitement is growing, however, and along the line of railroad the stores even, are being closed in consequence of the rush to the new gold field.

#### CALIFORNIA.

##### Amador County.

Hardenburgh.—It is reported that Alvinza Hayward, the well known mining millionaire, has taken an interest in this old mine, and consequently a thorough prospecting will be done. The shaft is 600 ft. deep. Some fine ore has been taken out, but the ledge is small, and it is now necessary to go deeper, the expense of which is too heavy for those who have been operating the property for the past two years.

##### Calaveras County.

Whiskey Slide, Gold and Silver Mines.—A large ledge on the Kinross Ranch, consisting of 280 acres, is said to average \$9.37 in gold per ton. A tunnel is being run to tap another vein and is now in 140 feet. The old tunnel, 400 feet long, on the old Whiskey Slide mine has caved in. Several other prospecting tunnels have been run. There is said to be plenty of timber and water on the property.

##### Monterey County.

The McGarrahan bill was taken up in the United States Senate on the 21st inst. and Mr. Hunton proceeded with his argument in favor of it. He had not concluded when the morning hour expired. On motion of Mr. Teller it was ordered that the bill should be taken up on the next morning.

The bill was taken up again on the 22d inst., and Mr. Houston concluded his argument in favor of its passage over the President's veto. Several Senators intend to speak in opposition, and on that account a suggestion to have a day and hour fixed for voting on it after the holidays did not meet with favor. The bill, however, retains its privileged place in the morning hour.

#### COLORADO.

Colorado Fuel and Iron Company.—This company will build a number of coke ovens at various points in order to meet the demand from the smelters. It is stated by the Denver "Sun" that 300 will be built at Coal Basin on Coal Creek, 30 miles west of Aspen, and 50 more will be added to the coking plant at Sopris.

A press dispatch from Denver states that one of the greatest gold excitements since the days of 1849 is at present attracting great attention in the West, and thousands of people from Arizona, New Mexico, Southern Colorado and Utah are said to be rushing into those new fields. The excitement is unparalleled, and towns along the Denver & Rio Grande, both in Southern Colorado and New Mexico are almost depopulated. Three thousand people are already upon the scene. It was for some time a matter of conjecture as to the exact location of these placer mines. Investigation makes them most accessible from Durango and Dolores. It is said the Denver & Rio Grande Railroad Company is already surveying a line. Nuggets of coarse gold have been received at Denver ranging in weight from 10 to 15 oz, and are similar to those discovered in California Gulch at the time of the Leadville excitement.

##### Boulder County.

The Denver "Times" publishes the following correspondence from Boulder, relative to mining affairs in this county: "The Ni-Wot-Madeline Company has gone largely into development work by running levels west into the old Ni-Wot property, which is looking well. Machine drills are employed in this mine with success. The new 40-stamp mill at Sunset is progressing slowly. The snowstorms have almost suspended operations at the property. A new 80-H. P. engine and two 40-H. P. boilers are shipped to the mill."

"At Sunnyside the mill is ready to start. The Black Diamond engine and shaft are complete, and

everything ready for mining operations. This is a new camp.

"At Copper Rock everything goes on finely. Each company is doing extensive development work for spring and summer shipments. The Orphan Boy Company will not attempt to take out ore until the veins are tapped in the tunnels and levels run on their trend for some distance."

##### Custer County.

Bassick Mining Company.—Messrs. D. Ryan, of St. Paul, and John McCarthy, of Denver, were in Silver Cliff consulting with the county commissioners. They say, according to the Silver Cliff "Rustler," that a deal has been made, and that if a tax settlement can be arrived at, work will begin at once on the property. They proposed to the commissioners that all the taxes, interest and penalties be thrown off. The commissioners refused, but they offered to throw off all interest and penalties and take actual amount of bare tax due—about \$12,000. "The Bassick folks," says the "Rustler," "offered \$6,000. The commissioners declined to vary from their figures, and the visitors left on the 13th inst. The total due without 1892 is about \$36,000. It does not seem that \$6,000 would be allowed by the Bassick people to stand in the way of such a deal, and we have reasons to believe it will yet be accepted."

##### Dolores County.

Rico-Aspen Consolidated Mining Company.—N. D. Lewis has once more brought suit against A. B. Roeder, D. L. V. Brown and the company, in which Lewis alleges the same causes of action as in his former suit, which he lost. He asks for damages in \$2,500 for loss of his position as superintendent of the mine, and for an injunction restraining the sale of any of the stock of the company until his rights are determined. He also prays for a decree cancelling the increase of the capital stock from \$300,000 to \$500,000. He claims an interest in a large amount of the stock by virtue of an agreement with Brown and Roeder before the formation of the consolidated company.

Sambo.—It is reported that a good strike was made last week in the Sambo group, held under bond and leased by Lorren M. Hart, Sam H. Bufghardt and Harry Simons. About 400 feet of development work have been done by them which resulted in disclosing a body of ore three ft. thick in a contact between lime shale and porphyry. The ore is a lead and gray copper ore, which runs high. The property is situated on Expectation mountain, above the old Santa Clara mill, and a strike in this locality is of the greatest importance to Rico. The formation is said to be identical with that of Newman's hill. Vertical veins having the same trend as those of Dolores mountain cross these properties, two of which have been cut in a tunnel now in about 280 ft. Ore streaks in these veins, so far as opened up, vary in size from 4 to 14 in., and the ore is of like character as that found in the contact. The lessees of the Sambo group are now putting up an ore house, and the property will be systematically worked all winter; new workings will be commenced at once with the view of opening up the ore bodies and developing the entire property.

##### Lake County.

The following items of mining news from Leadville are taken from our exchanges: In the Maid Consolidation a deal of work is going forward, while some 350 men are given steady employment. From the Maid and Henriett and Wolfstone, belonging to the Consolidation, over 5,000 tons of ore were shipped last month. There is a great deal of development work going forward at the Adelaide, and shipments are steady at 30 tons of carbonate ore. The lessees on the Evening Star are meeting with success, and considerable iron ore is being hoisted. Shipments will run over 100 tons daily. On the La Plata some seven leases are meeting with success. During last month the shipments run over 200 tons of good carbonate, some assays running as high as 44 oz. of silver, 30% lead. Other lessees are also doing well, and on No. 2 and 3 over 100 tons of iron is being shipped a month. In the Hudson, in the Granite district, a strong fissure vein has been encountered, which will average \$90 per ton. Some important development work will be done at once, after which shipments will be commenced.

Emmons Mining Company.—A deed of trust on the property of this company, with Joseph D. Hubbard, of Chicago, trustee, has been filed with the clerk and recorder. The property has been bonded for \$100,000.

Gray Eagle.—The shaft is now down 400 ft. and in line. The drift being run the first cross cut has gone through some good iron stained material, and the force of the contact, says the Denver "Times," shows a good body of iron averaging \$140 to the ton. Other cross cuts are meeting with excellent indications. The present work, adds the "Times," proves the continuity of the great ore chute west of the Carbonate fault.

##### Ouray County.

The Guston and Yankee Girl companies at Red Mountain have decreased their shipments fully one-half, says the Denver "Times." The American Girl Mining Company has been doing but very little work during the past year, waiting for the completion of the smelter at Durango. This has finally been blown in. In the Ouray gold belt not much work is being done. A rumor is current to the effect

that the American Nettie, which was one of the largest producers, has nearly suspended operations pending the completion of the new electric and hoisting plant. The Bright Diamond mine, which was a prominent one in this district, is being worked by only two or three men, while the ironclad employs only a little larger force. The Mineral Farm is running its mill steadily, and is producing a good grade of concentrates. The Virginius, which was last year one of the heavy shippers, has also decreased its output. The Humboldt mine, which is one of the large shippers of the county, has not been worked to its full capacity during the summer and fall. The Rochester Mining Company, which purchased the United States Depository mine, is now building a large concentrating mill upon it. It is expected that this mill will be finished and in operation at an early date. The Trust Ruby Company has been running its mill steadily since June, and has increased its capacity from 10 to 20 stamps. About 40 tons of ore per day are being concentrated.

#### Summit County.

Ohio Mining and Milling Company.—Contracts were closed on the 13th inst. for the sale of 21 claims and a mill site surrounding the Pennsylvania mines for \$100,000. The properties belonged to the Ohio Mining and Milling Company, of which W. H. Kern is president.

#### IDAHO.

##### Kootenai County.

Kootenai & Columbia Prospecting and Mining Company.—This company has received receipts of the smelter returns on their sample parcel of ore from the Wellington mine. The ore was shipped to Helena, and the statement received from the smelting company was as follows: The sample of ores had a weight of 2,989 pounds, and when an average of this was taken, the result was found to contain 22½% lead. There were 349 oz. of silver, \$280.20, and the gold value was \$2.09. This makes a total assay of \$297.88. The smelting cost will amount to \$22, and the freight an additional \$14.95, which will make the total expense after leaving the mine \$36.95 on the net proceeds from 2,985 pounds, or a net profit of \$260.93. From a second sampling of 2,053 pounds of ore the clear profits were \$209.84. From sample No. 3, where 3,708 pounds of ore were tested, the profits paid were \$197.77.

##### Owyhee County.

De Lamar Mining Company.—Following is a synopsis of the monthly report of the De Lamar Mining Company for November: Tons crushed, 2,370; ore shipped, \$10,000; bullion produced, \$68,521.65; miscellaneous, \$504.31. Total, \$79,015.96; expenses, \$37,866.95; estimated profit, \$41,149.81.

Trade Dollar Mining Co.—Following is the report of the output of this mine for November: Number of tons crushed wet, 902; dry, 839; bullion produced, \$11,243.48; concentrates (estimated from assays), \$42,082.78; ore shipped (estimated, \$4,000; total, \$57,326.26; expenses for month, \$13,144.94; estimated profit, \$44,181.32. In the mine most of the work is being done in the 100-ft. level of winze D, on the north drift, which is now in 117 ft. A stope 100 ft. in length has been started. The ledge averages 18 ins. of \$100 ore. A drift has also been started south from this level, and the ledge has widened out to 12 ft. 16 ins., of which on the foot wall is \$80 ore and the balance low grade. As the product of this level has to be hoisted by hand, work on the south drift has been discontinued. They are stopping over winze D, in tunnel No. 2, in good ore, the ledge varying from 10 in. to 2 ft. in width. In the Blaine tunnel the stope is 98 ft. in length, the pay streak being from 8 to 12 in. wide of \$150 to \$250 ore. The present face is in 2,050 ft, the ledge between walls 7 ft., and the formation soft, red porphyry. Both walls are hard. There are 10 inches of quartz and clay on the hanging wall, and 8 inches on the foot wall, showing some silver and iron. Looks very favorable for making a good body of ore. There is yet 600 feet to run to get under winze D, in the Trade Dollar, when by raising 300 ft. the connections will be made, and the big Blaine tunnel will become the working tunnel of the whole Trade Dollar group. Owing to the softness of the ground the air compressor has been stopped, and the tunnel is now being driven by three eight-hour shifts. A progress of about 7 ft. per day is being made.

##### Shoshone County.

Coeur d'Alene Silver Lead Mining Company.—The regular annual meeting of the stockholders of this company was held in Butte, Mont., December 15. Three hundred shares of the stock were voted. The following directors were elected: J. K. Clark, B. C. Kingsbury, Patrick Clark, H. L. Frank, C. W. Goodale, W. G. Galligher, and B. B. Thayer. Immediately after the stockholders' meeting the directors met and elected J. K. Clark, president; B. C. Kingsbury, vice-president; C. S. Eltinge, secretary, and J. V. Long, treasurer. B. B. Thayer was re-elected general manager. Mr. Thayer made a verbal report on the condition of the company's property, which, he said, was in better shape than ever. Mr. Thayer said that a great improvement was discernable in the character and extent of the ore bodies in the lower levels. The workings have attained a depth of 600 ft., and sinking will be immediately resumed and the shaft deepened an additional 100 ft. In the upper workings the levels are quite close together. Consequently there

are seven levels in the mine, the seventh being at the bottom of the shaft and has been only recently cut. No stoping has, as yet, been done on this level. The eighth level will be cut at a depth of 700 ft. Speaking of the ore and the output, Mr. Thayer said that the concentrator was running steadily and turning out 40 tons of concentrates daily, which are being shipped to the East Helena smelter. The last return received showed the concentrates to carry 29 ounces of silver and 58% of lead. The ratio of concentration is five to one.

Gem Mining Company.—Mr. J. A. Finch, one of the owners, is now in the east looking for the transfer of the Gem mine to an English syndicate for \$1,100,000. This Gem mine is situated on the north end of the mineral belt of the Trail Creek Gulch, and over 100 men are employed underground. The mine is one of the best equipped in the world, and the company is now erecting a school house and dwellings for the men. The output of the mine may be judged from the fact that during the year just closing, the sum of \$225,000 has been paid in dividends to the stockholders.

Idaho Antimony Company.—This company, operating on Pine Creek, near Wardner, will build a smelter on their property this winter. The machinery has already been ordered from a Spokane house. This will be the only antimony smelter in the west, with the exception of a small plant in Nevada. The ores of this company carry 60% antimony. It is believed that the enterprise will prove remunerative. The Kratzer group of antimony claims, near Thompson Falls, Mont. (in the Coeur d'Alene range), are said to produce nearly one-fourth of the antimony mined in the United States, and it is thought much of the product of these claims will be treated at the Wardner smelter.

Idaho Mining Company.—This mine is in excellent working condition. An average of 60 tons daily is treated by a 20-stamp mill. The company are preparing to put in 20 stamps additional, thereby doubling their capacity.

Last Chance Mining Company.—The owners of this mine near Wardner are negotiating for the purchase of a 300-ton concentrating plant for the treatment of their ores. The new mill is estimated to cost about \$50,000. The net sales of ore from this mine are about \$25,000 per month. The property is so far developed that the owners are finding it necessary to greatly increase the mill capacity to keep the ore dump down to its normal size. The new mill will be ready for operations in the early spring.

Mother Lode Mining Company.—This company is working steadily with a small mill from which it is cleaning up from \$2,000 to \$4,000 monthly with but the slightest effort. Two gold bricks which weighed about \$2,000 each, besides several handsome nuggets were the product of the mine for the month of October. Two large veins of blue and white ribbon quartz, which mills free about \$20 a ton, cuts through these properties.

Stemwinder Mining Company.—This mine is said to be looking better than ever. It is now working 85 men and its net shipments are between \$15,000 and \$16,000 a month.

Tin Cup.—An important strike has been made in this mine on the so-called "dry ore" belt of the Coeur d'Alene, about midway between Osborn and Wallace, on Gulch Lake. This property was bonded last spring by Major J. L. Montgomery, a capitalist of New York City. The strike was made at a point 300 ft. from the surface, and is high grade copper-silver ore—similar to the product of the Mineral Point and Nellie mines at this place.

#### MICHIGAN.

##### Gold.

Ropes Mining Company.—Ishpeming "Iron Ore" prints the following: "At the Ropes mine the night shift has been discontinued, and all efforts will be made at retrenchment. There is ore enough in sight to supply the mill for many months at the present rate of rock consumption, and it has been decided to put the property upon a paying basis. In the meantime explorations underground will be continued with the hope of finding other and more valuable lenses. This cutting down of force has led to the rumor that the mine would be closed altogether. The management is confident that the property will be wrought for some time to come."

##### Copper.

Alouez Mining Company.—The diamond drill which was removed a short distance to the southeast of the school house has been doing good work. On the 12th upwards of 18 feet were bored through. On the 16th the drill had penetrated to a depth of 211 feet, and was then in a broken trap, and it is supposed that in a very short time the Osceola amygdaloid will be reached. At a depth of about 80 feet an amygdaloid belt was encountered, and although it was 28 ft. thick, the core taken from it did not show any copper.

Calumet & Hecla Mining Company.—The anvils are being planed at the Hecla machine shop. They weigh 90 tons each. They are rapidly going into place on the foundations for the new stamp heads at the Lake Linden mills. A new engine house for the engine which is to run the man car at No. 5 Calumet is being built. In the bottom of No. 12 shaft South Hecla, there are some good streaks of copper ground coming in from the south. The

miners think that there must be some more rich conglomerate in the Osceola property joining on the south.

Portage Lake Smelting Works.—During this year's season of lake navigation, May to December, 93,000,000 pounds of refined copper was shipped from the smelting works at Portage Lake, valued at over \$11,250,000.

##### Iron—Gogebic Range.

Anvil Mining Company.—An annual meeting of the Anvil Mining Company was held last week at Milwaukee, and the following officers were elected: President, Gage E. Tarbell, of Chicago; vice-president, Frank J. Kipp, treasurer, Rudolph Nunemacher; secretary, E. A. Conrad. About 50,000 tons of ore were shipped from the company's mine during the past season.

Brotherton Iron Company.—This mine has had a good season. The record of shipments is \$105,603 tons. This year's shipments, however, represent more than the 1892 business of this mine, for little ore was sent forward last season, and there was a consequent stock-pile accumulation left over that figures in this year's record. The stockholders of the mine have received notice that a dividend of 50 cents a share will be paid on January 3d, 1893.

##### Iron—Marquette Range.

Lake Superior Iron Company.—On the Dec. 16th ore was encountered in the west shaft of the Lake Superior Iron Company, at section 21, adjoining the Winthrop mine. It was struck at a depth of 250 ft. nearer surface than was expected.

Saginaw.—The explorations at this mine has been stopped. The company is looking for other property to develop. Says Ishpeming "Iron Ore."

Sheridan Iron Company.—This mine, located at Iron River, produced about 50,000 tons of ore this season. Their is no truth in the rumor that the company had any thought of transferring its mine equipment of machinery to the Mesaba range. Says Ishpeming "Iron Ore."

##### Iron—Menominee Range.

Aragon.—Preparations are about completed for the sinking of No. 2 shaft to a greater depth. As to the rumor that a new shaft will be sunk at once, Superintendent Larsson informs the Norway "Current" that he has so far received no orders to that effect.

Commonwealth Iron Company.—With the close of the shipping season this company has begun to systematically prepare for a large output next year. Sinking and drifting are now being done, while a hoisting plant and compressor, together with the necessary boilers are being placed in position.

Pewabic Iron Company.—Last week we visited, says the Norway "Current," this company's exploration east of the Badger mine in Florence county. The shaft which is being sunk is located east of Badger about 800 ft. and about 300 ft. from the line between the two properties. It is down something more than 100 ft and will be sunk 60 or 70 ft. deeper before any cross cutting is done.

Vulcan.—The water which has been giving some trouble at Southeast Vulcan has been gotten out and the usual amount of work is being done.

#### MONTANA.

##### Deer Lodge County.

Bi-Metallic Extension Mining Company.—A meeting of the stockholders of this company was held last Saturday to consider a proposition to sell the entire property and mines. The object of the proposed sale is as follows: The company is in debt and there is no sale for the treasury stock now in the hands of the trustee, and the stock of the present company is non-assessable, and there is no means of raising money to pay its debts and prosecute the work of developing its mines. It is therefore proposed to effect a change so as to make the stock of the company assessable in order to raise money for such purposes, and for that purpose it is proposed to sell the property to a new company to be organized, the stock of which is to be made assessable, and that the present existing company be thereby discontinued. There will also be submitted the proposition of selling the remainder of the capital stock, and known as the treasury stock, that may be in the hands of the trustee on the date of said meeting.

Puritan Mining Company.—The incline shaft following the vein is now about 230 ft. deep. There is a level at 100 ft. and another at 200 ft. from the surface. The mill has been running on the ore stoped from the 100-ft. level for two months, and there is now in the ore houses more than enough for another month's run. On the 200-ft. level drifts following the vein both ways from the shaft are in about 180 ft. each side, and the rich silver-lead chute of ore is continuous, varying in width, but averaging 10 inches. The vein itself on this level is in places 10 ft. in width, but at no place on this level is it less than 3 ft. wide. The richest ore which is being shipped lies on the foot wall of the lead and is imbedded in a tale that is highly impregnated with silver. Sinking is now in progress, and in the bottom of the shaft there is 15 inches of silver-lead ore, showing wire silver in abundance.

##### Silver Bow County.

Alice Gold and Silver Mining Company.—At a recent meeting of this company the question of shutting down was discussed without arriving at a conclusion.

Anaconda Mining Company.—The Anaconda properties are closing down two at a time, the last to suspend being the Green Mountain and Wake-Up Jim, belonging to the syndicate, says the Butte "Miner." These mines ceased their production with the expiration of the work on the day shift on Saturday evening, and will not be started up again until the "blue dust" at the smelters is worked up, which will require from a month to three months' time. Of the Anaconda mines only two are now producing, and it is said they, too, will be shut down to await the consumption of "blue dust." The two are the Anaconda and St. Lawrence, which adjoin each other. The four mines now closed are the Mountain Consolidated, High Ore, Wake-Up Jim and Green Mountain, the shafts of all of which are being deepened. At Anaconda only one smelter is in operation, the other having closed down several weeks ago.

NEVADA.

Eureka County.

(From our Special Correspondent.)

During the month of November there were transported over the Eureka & Palisade Railroad a total of 1,498 tons of ore consigned to Salt Lake City. Of this amount Eureka District contributed 1,403 tons and White Pine 95 tons. There was a falling off in amount hauled of about one-third, owing to the stormy weather.

Lincoln County.

Keystone.—This mine is situated six miles northwest of Good Springs, in the extreme southwestern portion of this county. The ledge, which varies in width from 1 to 7 ft., is a contact between porphyry and limestone. The deepest workings are only 100 ft., while the length of the ore exposed is about 60 ft. No lead is found in the ore. A piece of talc, about 3 in. in diameter, from the Keystone, sawed in two, showed the yellow metal running all through. The probable daily output of this mine is placed at five tons, and over 200 tons of ore now lie on the dump. Work on the property is in active progress. The Golden Chariot, an adjoining claim, is much in character like the Keystone, though the ore is not nearly so plentiful nor so rich. The edge is about the same width, but the deepest workings are only some 30 ft. Fifty feet of ore is exposed which will run 4 oz. in silver and \$50 in gold to the ton, while about 75 tons of ore lie on the dump. Four miles further northeast, or ten miles from Good Springs, lies the Boss, another gold property. The vein here is a fissure in limestone, running from 2 to 7 ft. in width, the gangue carrying about 20% iron, the ore running \$6 in silver and \$15 in gold. Ore is exposed in this claim for about 100 ft., while the deepest workings reach only 40 ft. Fifty tons of ore lie on the dump, and 25 tons a day is a low estimate for its output. Another mine near the same place also called the Boss, is a copper property carrying gold. The vein, like the other Boss, is a fissure in limestone, running from 1 to 5 ft. in width, the ore carrying five ounces in silver and \$5 in gold to the ton, and some 30% copper. The deepest workings on this claim are 40 ft., with about 30 ft. of ore exposed and about 25 tons lie on the dump. Its average daily output is estimated at five tons. Yellow Pine district is so remote from all habitation, and so difficult of access, that we hear comparatively little about it. Its nearest railroad station is at the A. & P. road, south some 90 miles.

Storey County—Comstock Lode.

At a meeting of the Pumping Association, composed of the Gold Hill mining companies, on the 15th, the drainage question on the Comstock was thoroughly discussed. It was explained that the pumps now at work in the Crown Point incline, although performing all that was contracted for, were unable to cope with the water, and a committee, consisting of Messrs. Harmon, Hirschfeld and Hamilton, was appointed to confer with the managements of the middle and north end mines and induce them to place similar pumps in the Chollar-Norcross-Savage (combination) shaft and some northern shaft, and make a combined effort to drain the lower levels of the Comstock and resume deep mining.

Consolidated California & Virginia Mining Company.—Mr. D. B. Lyman, superintendent of this company, writes as follows under date of the 11th inst: "We have been having a great deal of trouble in the Consolidated Virginia ground from gas from the old stopes. Last night at 11 o'clock fire broke out a little below 1,650 ft. level, and quickly drove our 1,500 level men from that level. They retreated via the Ophir shaft. This new trouble has compelled us to bulkhead the 1,650 and 1,750 levels on the C. and C. side; and cutting us off from all the ore producing points in the mine that amount to anything. There will not be any further extraction of ore for an indefinite period. We have got 900 tons of ore in our mine dump, which will be worked, and then milling will cease. To-morrow we commence putting in brick bulkheads with cement, and will in time make the mine smell sweeter than at present." On the 12th inst. he wrote as follows to President Fish: "Our mine troubles seem to be quieting down; at least the old Consolidated Virginia shaft does not vomit up so much smoke and gas. So far as I can see, we are masters of the situation, and I feel relieved in mind."

On the 13th inst. the directors levied an assessment of 50c. per share, \$108,000. This is the first assessment since January, 1885.

Overman Mining Company.—The latest official weekly letter says that 257 tons of ore was extracted from the 1,100 and 1,200 levels. Car samples averaged \$20.47 per ton. Shipped to the Vivian mill 312 tons of ore. Battery samples averaged \$19.76 per ton. Shipped \$7,541.82 in bullion on the 7th inst.

Savage Mining Company.—The latest official weekly letter says: "On the 1,100 level the upraise from the sill floor, 300 ft. from our south boundary, has been carried up 53 ft.; top in quartz giving low assays. On the fourteenth floor a prospecting drift started 20 ft. north of the upraise ran into ore, which has widened to 8 ft. This is of good quality and is being stoped and sent to the mill. Prospecting drifts are also being run from the eighth and eleventh floors to reach the downward continuation of the ore found on the fourteenth floor. These drifts are now advanced 27 and 12 ft. respectively. On the 1,450 level a west crosscut, started about 100 ft. from our south boundary, was advanced 38 ft. This crosscut passed through a stringer of good ore about 9 in. wide. The joint north drift with the Gould & Curry Company, on the Suro-tunnel level, was advanced 12 ft.; face in hard porphyry."

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore extracted from Comstock mines, and milled with the car and battery assays, bullion shipments etc.:

Mine.	Tons hoisted	Av. car sample, as'y	Tons milled	Av. get-al-tery assay	Bullion product, for week	Bullion shipped
Belcher.....		\$		\$	\$	\$
Con. Cal. & Va.....	883	23.68	980	20.63		17,904.15
Col. New York.....	177	44.00				
Justice.....						
Ophir.....	237	20.44	31	19.76		5,898.48
Overman.....	43	21.03	112	20.09		7,541.82
Potosi.....						2706
Savage.....						

<sup>1</sup> Cars. <sup>2</sup> Crude bullion.

Consolidated New York Mining Company.—From 10 to 12 carloads of ore are being taken out each day, the car sample assays averaging as high as \$45. The ore is now being shipped to the Washoe mill. The test run of 104 tons 1,533 lbs. of ore resulted as follows: Car sample assay, \$46; battery sample assay, \$39.20; producing bullion valued at \$4,172.72.

NEW MEXICO.

Lincoln County.

Lady Godiva.—On October 1st this mine was closed down for repairs and work was not resumed until November 20th. A drift was run west to cut the ore body in the west vein. This work has disclosed the vein to be better defined, and the ore shoot more extended along the fissure than heretofore encountered in any of the upper workings of the mine. The ore body at the 625 ft. level is now explored 125 ft. and is still continuous both north and south along the fissure. This development will be contued until the full dimensions of the ore chute are disclosed. This is the most extensive ore shoot yet exposed in the camp says the White Oaks "Eagle."

Miguel Otero.—According to the White Oaks "Eagle," negotiations are now pending for the lease of this property and it is probable that active development will again be resumed very shortly. This claim lies across the north end of the Old Abe property, up the mountain, and upward of \$5,000 have been expended thereon in exploring for the Old Abe lead.

Old Abe Mining Company.—The excavations for the mill are almost completed and the company is now getting out the timbers for the building. The walls of the reservoir are all up and ready for cementing. A portion of the mill machinery has already been shipped and the rest will follow soon. The whole shipment will weigh about 135,000 lbs.

Solitaire.—This mining claim, about which there has been so much litigation in the past, was sold under an execution on the 8th inst., and was purchased by B. H. Dye for \$10,000, says the White Oaks "Eagle." It was in the south end of this property that the North Homestake bonanza was developed.

Sierra County.

The starting up of the smelter at Kingston has given great activity to mining, says the "Southwest Sentinel". A number of mines and prospects which have been idle are now being worked, and the ore is being hauled to the smelter for reduction.

Iron King Mining Company.—This company, of Kingston, says the Silver City "Sentinel," has uncovered the largest body of iron manganese ore to be found anywhere in the Southwest.

OHIO.

The Hocking Valley bituminous coal operators concluded their business conference at Columbus on the 18th inst. The question under consideration was the allotment of tonnage among the individual operators. This was the obstacle in the way of forming a company, under an agreement to buy and sell all the coal output of Central Ohio, as stated in the ENGINEERING AND MINING JOURNAL last week. It is expected that the company will get into operation by January. According to a press dispatch the company will handle over 4,000,000 tons a year. The

organization expects to save at least 5c. per ton in the handling and cutting of rates will be averted. There is now a circular price of 90c. a ton for Hocking Valley coal. With mining 70c. and royalty for 7 to 10c., there is little margin left. The operators think at least \$1.10 should hold for coal. They claim the object is not to increase the cost of coal to the consumer, but to diminish the cost of producing and handling.

PENNSYLVANIA.

Coal.

The No. 2 colliery at Silver Brook was idle for a few days last week on account of a surplus of water. A heavy stream of water was tapped in the west gangway and work had to be suspended. It is thought that by the aid of an additional pump, work may be resumed shortly.

Serious trouble is threatened at Elkhorn and a force of deputy sheriffs has been sent to the scene. The reason for the alarm is a threat that a number of the striking miners would come down to Elkhorn and drive away the colored miners which W. H. Brown & Sons brought from Virginia to work in their colliery.

A press dispatch states that the four mining districts comprising the Lackawanna and Wyoming Valleys will close the year with a long list of underground accidents and disasters. In the mines of the First, Second, Third and Fourth Districts there have been recorded this year a total of 797 accidents of which 204 were fatal.

A dispatch from Pittsburg states that the river coal operators are surprised and disappointed over the action of the Miners' Convention at Monongahela City. The unanimity with which the miners have decided to remain firm was unexpected, and the belief that they would go to work by January 1st has been dispelled. The operators maintain they are determined as ever not to grant the two per cent. rate.

The Orchard Vein Colliery, located near Wadesville, against which there were labor claims aggregating over \$3,000, was sold out on the 19th inst. at Sheriff's sale for \$900. The purchaser was B. W. Cummin, Jr., attorney for McTurk & White, who operate the Denning Colliery, which adjoins the Orchard Vein. The new purchasers will begin work shortly, and will employ about 200 hands.

The Cresson, Clearfield & New York Short Line Railroad has been purchased by the Pennsylvania Railroad Company, and its property and franchises will be taken possession of by the new owners on January 1st. The line, which is 30 miles long, extends from Cresson, in Cambria County, to Irvana, in Clearfield. It has two branches running to coal mines, and traverses a region rich in coal, lumber and minerals.

According to the Brownsville "Monitor," Messrs. Chalfant and Stewart of that place have purchased from George M. Conarroe, of Philadelphia, the Rush Run track of coal land in Luzerne, about two miles above Brownsville. There are about 475 acres in the track, and the price paid was \$55 per acre. It has a river frontage at Rush Run, and Mr. Conarroe purchased it several years ago at \$15 per acre. It is the intention of the purchasers to develop the coal at once, and in short time, it is said, works will be constructed there that will employ 250 to 300 men.

A number of changes will be made immediately at the Audenried No. 4 breaker, says the Hazleton "Plain Speaker." The plane which at present is situated at the southern end of the breaker dipping south will be changed to the side of the structure, so as to allow the removal of the surface to obtain the coal which lies directly underneath the plane. A new slope will also be sunk to correspond with the change. This will enable the company to obtain a large quantity of coal, as stripping can be continued within a radius of nearly a mile.

North Carbondale Coal Company.—This company chartered in 1864 "for a period of 20 years, for the purpose of developing and improving mineral lands," has been made defendant in a suit brought by Jessups and Hand, attorneys for Ann M. Phillips, the executrix of the estate of Samuel R. Phillips, of Philadelphia. It is alleged that the defendant acquired its interest in valuable coal and timber lands, nearly 3,000 acres, near Carbondale, for a mere nominal sum, through Mary C. Wallace, the administratrix of Francis B. Wallace, late of New York City. It is stated in the declaration that the gift of the land was fraudulent, and the title, therefore, invalid. The amount which Mrs. Phillips claims as due her from royalties is \$500,000.

Philadelphia & Reading Railroad Company.—The report of this company for the year ending June 30th, 1892, was received at the Department of Internal Affairs of the Commonwealth, on the 21st inst. It is, however, incomplete, as it does not give the current assets and liabilities, nor the general balance sheet of the time of making the report. Deputy Secretary Brown has notified the company of these defects, and requested a supplemental report. From the report it is learned that the company owns or leases and operates 39 lines with a total mileage of 1,916 miles, of which 1,353 are in Pennsylvania. The capital stock outstanding is \$40,105,361.78, the funded debt is \$153,800,402.45, with accrued interest of \$6,013,902.95. A recapitulation of the total amount outstanding is as follows: Capital stock, \$40,105,361.98; bonds, \$153,800,402.45; car trust, \$3,514,000; total, \$197,419,764.23. The capital stock of the roads operated by the Philadelphia & Reading, not including

its own, is \$108,536,851.35, and the funded debts of these roads is \$205,416,702.45. The total expenditure by the company for construction and equipment during the year was \$4,434,339.59. The total cost of the road up to June 30, 1892, was \$105,668,006.87. The gross earnings from operation were \$32,942,216.97; the operating expenses were \$18,853,188.19, leaving an income of \$14,089,028.78. There was an income of \$575,163.69 from bonds owned and miscellaneous sources, making a total income of \$14,664,192.47. Interests, rentals, taxes, etc., amounting to \$14,280,480.45 are deducted from this total income, leaving the net income \$383,712.02. Under the head of "other payments from net income," there is an item of \$982,036.53, showing a deficit from the operations of the year of \$598,324.51. There was a surplus of \$1,334,754 on June 30th, 1891, out of which this year's deficit was paid, leaving the surplus on June 30th, 1892, just \$736,369.49. Announcement is made that the Philadelphia & Reading leased the Lehigh Valley Railroad for 999 years, from December 1st, 1891, and among the items of rentals paid is \$1,514,457.50 interest on bonds guaranteed, and \$2,016,740 dividends on stock guaranteed of the Lehigh Valley. The total of rentals paid for other companies by the Reading is \$5,313,229.66. The increases made in the funded debt during the year amounted to \$7,503,419.96.

#### SOUTH DAKOTA.

##### Lawrence County—Coletta.

Bald Mountain Mining and Milling Company.—It is stated that a transfer of all the property of this company will be made to an English syndicate for a large sum. It is impossible to obtain definite information. All local indebtedness will be liquidated before that time.

Bristol.—A discovery has been made in this property. Near the surface, some distance from the old workings, a vein of about 2 ft. in thickness has been struck.

Gold Mountain.—The owners, Messrs. Russell and Higbie have a force of men at work getting out ore for shipment to the D. & D. smelter. One ton and one-fourth recently treated at the smelter gave a return of \$73, exclusive of the smelter charges.

Gold Mining Company.—This mine has about 500 ft. of tunneling. The ore is of an iron carbonate nature that assays from \$10 up to \$150 in gold. This mine is now shipping 600 tons to the Omaha & Grant smelter. The ore is desirable for smelting so the treatment charge is but \$2 a ton, it is said.

Grand Republic.—This property, located at the head of Nevada gulch, is opening up nicely. The property is owned by Judge Bennett and George Wilson, who have had a force of men at work developing for several months past. Last week, at the depth of 75 ft., a good body of ore was struck. A shaft will be sunk and the find fully developed.

Harris Franklin, on the part of a syndicate, purchased from R. M. Maloney four claims on Blacktail gulch, known as the Wells-Fargo group. The consideration paid was \$65,000. The property was bonded and when the bond fell due it was promptly taken up. The property lies some distance below the Garden City divide and extends across Blacktail gulch. It consists of the Wells-Fargo No. 1, No. 2, No. 3, and Wells-Fargo Fraction lode. The claims are considered of great value. The ore averages over \$40 a ton, and considerable of it has been shipped to the D. & D. smelter, netting handsome returns.

Homestake Mining Company.—W. C. Fullerton, an employe of the Homestake Mining Company, received injuries while in the performance of his duties some time ago, which made the amputation of both his legs necessary. He brought action for damages against the company, claiming \$40,000. The case was tried in the United States court at Sioux Falls last week, and the jury awarded the plaintiff \$20,000. The case will be taken to the court of appeals.

Horseshoe.—The shaft on this property is down 180 ft., and being sunk quite rapidly. It will be sunk 70 ft. farther before finding the ore body. The result of this venture is being closely watched, as it will tell the story of the depth of ore in the Bald Mountain district.

Oro Fino Mining Company.—This mine is now down about 280 ft. On this level, another contact of iron, which it is said, assays over \$200 has been struck. It is working three shifts and employs 45 men. The mine is owned by the Deadwood & Delaware Smelting Company.

#### UTAH.

##### Juab County.

(From our Special Correspondent.)

Herkimer Mining Company.—Mr. C. F. Saviers, the general manager of this company, informs your correspondent that on the 14th inst., the shaft had been sunk to a depth of about 400 ft. from the surface, and that he expects to find ore at any time, as the indications are very favorable. This shaft was started at a depth of 130 ft., and on November 15th was down 260 ft. Air drills and an Ingersoll-Sergeant air compressor are being used, and 16 men are employed at the mine.

This company owns and controls the Luckey Jack, Belcher, Rosa, Red Rapparee, Piney, Mollie S., Contact and Cane claims embracing an area of some one hundred and seventy acres. To the north of this property and adjoining are the Bullion-Beck, Cen-

ennial Eureka, Eureka Hill and Keystone mines, while the Mammoth is adjacent on the southeast.

The development work consists of a double compartment perpendicular shaft, well timbered and down to a depth of 400 ft. There have been between three and four hundred feet of drifting and cross-cutting done. The mine is well equipped with machinery, tools and accommodations for the men employed, and the sinking of the shaft is being pushed as rapidly as possible.

Ibex.—This property, about 35 miles from Desert, is developing rapidly, and large quantities of good shipping ore are being taken out. Sixteen men have been working steadily since last May. They have sunk 170 ft. and have run 195 ft. of tunneling, costing from \$3 to \$20 per foot. The vein is 80 ft. thick, pitching at an angle of 45 deg., with the hanging and foot walls clearly defined. The vein has been cut across at different places and stripped for a considerable distance. A streak of 4 to 5 ft., next to the footwall, is high grade ore, and is being shipped at a large profit.

##### Summit County.

Ontario Silver Mining Company.—In speaking of the long drain tunnel, the Park "Record" says: It required six weeks recently to drive five feet and put in a set of timbers. It is almost impossible to make headway at all in the ground which has been encountered. It is decomposed porphyry, though many miners consider it to be vein matter. The ground runs like sand, and the greatest care must be used to hold it in check. The formation shows a hard streak coming in at the bottom, and Mr. Keetley hopes that a few more feet will put the tunnel in solid ground again.

##### Washington County.

The Dixie Copper Mining and Smelting property has been bonded for \$500,000. Mr. Woolley, of Woolley, Lund & Judd, the owners of the property, gave out the following statement for publication: "We have given a bond on the property to a London syndicate. If the sale is consummated it means \$250,000 of working capital put into the property, which will insure a sufficient plant for carrying on a large business. This, of course, is in addition to the cash received by the owners. Having perfect confidence in the property, the owners have agreed to take a portion of the purchase price in stock. It virtually means a \$500,000 proposition. We have only been working a 20-ton smelter, and our work has been in the nature of development. The smelting facilities and output of the mines will be greatly increased."

#### FOREIGN MINING NEWS.

##### BRITISH COLUMBIA.

##### Slocan.

Anton Eilers, of New York, recently through the Commercial National Bank, of Helena, made the last payment on the Freddie Lee mine in the Slocan country, says the Spokane "Review." The beneficiaries were M. M. Fry, and his partner, who were the original discoverers. The Freddie Lee was bonded last June by a company of mining capitalists, headed by James F. Wardner, of Fairhaven. The bond was given for a period of six months and since development work was begun to be actively pushed. Ore is now being shipped regularly and the property could not be bought for \$100,000. A company will be organized in New York at once. Spokane will be given two directors and Helena will get an equal number. The remaining four will be from the stockholders in New York City, where the main office will be located.

Patrick Clark, until recently superintendent of the Poorman at Burke, Idaho, has bonded the Rico group of prospects on Carpenter creek, 20 miles from Kaslo, for \$75,000. The claims bonded are five in number, the original locators retaining two in the group. The Rico carries 6 ft. of clean shipping galena and 18 in. of carbonates. The galena assays about 200 oz. in silver and 80% lead. The carbonates in the Rico assay 50 oz. in silver to the ton.

#### CANADA.

##### Province of Nova Scotia.

All the miners of the Spring Hill collieries, at Spring Hill, the largest in Nova Scotia, struck on the 19th inst. and operations entirely ceased. The immediate cause of the trouble is grievances respecting short weight and docking. One thousand persons are thrown out of employment.

##### ONTARIO.

Canadian Copper Company.—Several prominent Canadian attorneys were in Cleveland on an important mission. It is an examination ordered by the High Court of Justice of Canada in the suit brought by the Central Ontario Railway against Senator H. B. Payne, Judge Stevenson Burke and H. P. McIntosh, of Cleveland, and S. J. Ritchie, of Akron. The claim set up is that funds of the railway were illegally diverted from the railway to the Canada Copper Company and the Anglo-American Iron Company, of Canada, and several millions of dollars are involved. Judge Burke is president of the railway and both the other companies, and the other defendants are stockholders in all three of the corporations.

#### MEXICO.

##### Chihuahua.

(From our Special Correspondent.)

Last June Andrew Fraser, who went to Mexico as an expert engineer to superintend the erection of

mining machinery at the Jesus Maria mines, was murdered near Guerrero while traveling from the mines to the city of Chihuahua. After all these months punishment has been meted out to his murderer. It appears that Mr. Fraser was shot by Antonio Ochoa, his Mexican guide, who after taking possession of his employer's effects made haste to escape. Two Mexican travelers, who had heard the fatal shot and met Ochoa a few minutes later burdened with Mr. Fraser's effects, gave the alarm. T. E. Sexton, superintendent of the Santa Juliana mine, and a posse of men started in pursuit and overtook the fugitive after two days' chase. Ochoa was shot and wounded while resisting arrest. Being tried and convicted he was, on December 1st, handed over to armed guards to be taken to Chihuahua. While "attempting to escape," while *en route*, he was shot. This seems to be an inexpensive way of executing criminals in the sister republic.

#### LOWER CALIFORNIA.

(From our Special Correspondent.)

The sale of the onyx quarries at Los Tules, owned by the widow of the late Casimiro Murillo, has been completed and the sum of \$100,000, half cash, and the balance in stock of the company which has been formed to work in immense deposits, paid over. The purchasers are Eli H. Murray and G. Foster, of San Diego, Cal., the latter a partner of Murillo's; J. F. Alexander, of Louisiana; Prof. G. S. Fellows, of Washington, D. C., and capitalists whom he represents. The quarries are to be worked on an extensive scale, the rock being shipped to San Diego for blocking and forwarding to an Eastern factory, where it will be cut and polished. Later it is intended to establish a factory at or adjacent to the town of San Diego.

##### Nuevo Leon.

Iguana.—These mines, which are the property of the Fort Scott Mining and Smelting Company of Denver, Colo., are reported to be doing well. The "Two Republics" says of this property: "Several months ago, Mr. A. A. Marlett was appointed superintendent of the mines, and began a redevelopment of the old workings with notable results. Recently he has directed his attention to new ground, and has opened up new drifts in various directions with still better indications of rich ore deposits. Mr. Marlett states that the vein lies in an almost horizontal position, varying in width from 1 to 5 ft., carrying all good ore running from \$50 to \$150 per ton. The foot walls often widen into pockets of from 5 to 10 ft. in diameter and 7 or 8 in. deep in which the richest ore is found. From one of the most recently discovered pockets 700 lbs. of ore have already been taken, worth \$4.50 per lb.

Santa Anita Mining Company.—This company owns five mines known as the Santa Anita, Santa Catalina, San Felipe, Cinco de Mayo and Mizpah, which are worked through shafts and tunnels. From the San Felipe, which is the principal mine at present under actual development, 900 tons of ore have been placed on the dump, from the main tunnel, without stopping or drifting. The ore is galena, carrying from 40 to 55% iron, 3 to 20 oz. of silver and 5 to 20% of lead, the average assays of the five mines giving 10 oz. of silver, 6% of lead and 50% iron. Several shipments of ore from the mines have been made to the Monterey smelters. The development of the mines is being pushed and five tunnels and three shafts are already being worked. The ore lies in a blanket formation.

#### MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 622 and 624.]

NEW YORK, Friday Evening, Dec. 23, 1892.

The mining stock market during the past week has been as dull as ever. The features, if such they can be called, were the demand for Phoenix of Arizona, Leadville Consolidated and one or two other stocks; but about none of these was there much excitement.

THE ENGINEERING AND MINING JOURNAL knows, and so do its readers, that 1892, as a whole, has brought little prosperity to the New York mining stock market; but at the same time it begs to remind the brokers that the market *might* have been worse—for everything, even that, is possible.

In these times of rejoicing and thanksgiving the JOURNAL wishes a Merry Christmas to all; and it hopes that 1893 will prove a year of active business and of great prosperity in mining circles, whether in the field or in the exchanges.

The Comstocks show no improvement over last week. The levying of an assessment of 50c. a share by the Consolidated California & Virginia caused the price of that stock to decline to \$1.10. During the week 300 shares were sold at prices ranging from \$1.10 to \$1.30; the last sale was made at \$1.40. In our mining news columns will be found the latest information from this property. Gould & Curry shows a sale of 100 shares at 65c. Of Hale & Norcross 20 shares were sold, the price declined from \$1.25 to 95c. Other sales were as follows: 225 shares of Ophir at \$1.65@1.85; 50 shares of Sierra Nevada at \$1.40; 100 shares of Yellow Jacket at 60c.; 3,000 shares of Comstock Tunnel stock at 8@9c., and 200 shares of Union Consolidated at \$1.20@1.25.

There was a sale of 200 shares of Barcelona at 8c. Of the California stocks we note sales of 200 shares of Bodie Consolidated at 25c., and 200 shares of Bul-



wer at 15c. Of Brunswick Consolidated 2,400 shares were sold during the week at 11@14c; the superintendent of this company, writing under date of the 16th inst., reports the total depth of the shaft on that day at 691½ft; the total depth of the east drift was 126 ft; of the west drift, 143 ft. On December 19th Mr. William A. Hawley, for many years in the employ of the Idaho Gold Mine was appointed superintendent of the Brunswick mine. Mr. Hawley has had 18 years experience in mining in the Grass Valley district, and comes highly recommended by Mr. Edward Coleman, superintendent of the Idaho Company. Mr. Hawley took charge on the 22d inst.

Of the Colorado stocks, Leadville Consolidated was the most active; during the week it ruled steady at 19@22c., with a total sales of 11,000 shares, or more than one-half of all the business done at the Exchange. Of Chrysolite 500 shares changed hands at 23c. No other Colorado stock was dealt in.

Alice shows sales of 400 shares at 59c. The other Montana stock, Moulton, was dealt in for the first time in months; 500 shares were sold at 30c.

Deadwood Terra was in fair demand, but actual sales were comparatively small, amounting to only 300 shares at \$1.10@1.40.

Of Horn Silver 400 shares were sold at \$3.25@3.30. Phoenix of Arizona was in considerable demand during the week, and 1,600 shares were sold at 55@60c.

**Boston.** Dec. 22.

(From our Special Correspondent.)

The market the past week for copper stocks has suffered from the general depression incident to gold shipments and a tight money market, and prices have yielded, especially for the speculative list, while the dividend paying stocks have barely held their own. Boston & Montana have been especially weak, a good deal of it being held on small margins, which has caused more or less liquidation, and some stop orders were reached, causing it to decline to the lowest figure for same time. Early in the week sales were made at \$33¾, but prices settled to \$31¾ to-day on free offerings. It is not unlikely that lower prices will be made before the year closes. Butte & Boston was also weak, being affected by the same causes, although the dealings in it have been on a smaller scale. The stock closed last week at \$11½ and it declined to \$10, which was the lowest for the week.

Of the Lake Superior stocks, Osceola has been the most active, and shows a decline from \$35¾ to \$34½, with later sales a fraction better.

Franklin has announced a \$2 dividend, payable next month, and its friends express confidence from the outlook that the company will be able to pay \$4 per annum, with a fair price for ingot copper for some time to come. Sales at \$14¼@14½, same as last week.

Tamarack sold at \$160, but declined to \$154. Nothing has been said about a dividend next month.

Calumet & Hecla sold at \$200½ for one share, and \$2½ for four shares, the only transactions for the week.

Quincy has been in good demand by investors at \$144@145, with sales at both figures.

Kearsarge sold at \$12, but declined to \$11½ on moderate transactions.

Centennial declined to \$7, with very little doing in it.

Tamarack, Jr., sold in a small way at \$21, while Atlantic declined from \$10 to \$9½. It is reported on good authority that there will be no dividend on Atlantic at present.

Wolverine sold at \$18½, but later sales were at \$17½.

Allouez declined to 75c. and recovered to 90c. There were no sales of Arnold reported.

In silver stocks Napa quicksilver declined ¼@5%. Catalpa & Dunkin sold at 15c. each.

3 p. m.—Centennial advanced to \$7½ this afternoon, but Tamarack, Jr. declined to \$19, with last sale at \$20. Others unchanged.

**San Francisco.** Dec. 16.

(From our Special Correspondent.)

The outburst of gas in the Consolidated California & Virginia mine knocked the stock market to pieces this week and prices along the entire line of Comstock shares have suffered. If anything further was required to depress the market the 50c. assessment levied on the bonanza stock fully answered that purpose. The price of the stock dropped to \$1.80, and to-day has sold down to \$1.65. Superintendent Lyman holds out encouraging hopes to the stockholders regarding the reopening of the favored portions of the mine, but that is in the uncertain future. Meantime, the stock is not likely to maintain itself at present ruling figures. The heavy blocks of stock thrown on the market would have resulted most probably in the bottom of it falling out altogether had not insiders stepped in and, absorbing some of the stock, steadied prices.

The joint drift of Sierra Nevada and Union Consolidated has been carried 2,712 ft., passing through hard porphyry into an open fissure of clay and quartz with a 3-in. (miners) flow of water from its face. This report has acted as a stimulus to the stock which has scaled from \$125, last week's ruling rate, to \$140 despite the set back which Union in common with the other North Enders received at the time of the collapse of Consolidated California & Virginia. Ophir sold to-day for \$1.70, a decline from \$2.55, the ruling price last week. Mexican sold \$1.30, Sierra Nevada for \$1.40, and Utah Consolidated for 10c.

In the middle Comstocks Potosi sold to-day a point off last week's figures after, however, having scaled to \$3. No further news has been received from the mine, but the ore in the raise, from the 1100 level, still continues good. Sales were freely made to-day at \$1.95. Best & Belcher sold for \$1.25; Chollar for 75 c.; Gould & Curry for 65 c.; Hale & Norcross for \$1.25; and Savage for \$1.10.

Some additional interest is being given to the South End & Gold Hill Comstocks by the action of Pumping Association. Some time ago several of the companies withdrew from the organization, and as it has been clearly apparent that the return so far for the expenditure of half a million dollars has been merely nominal. Means had to be devised to prevent the Association from dying a natural death. Pressure is being brought to bear upon the north and middle Comstock companies, and the threat is being made that if assistance is not given operations will be stopped.

It is hoped that the threat will have the effect of whipping into line all the companies operating on the Lode and the dilatory drainage tactics continued indefinitely. Belcher has continued the favorite stock, having sold to-day to \$2 under sales amounting to 3,000 shares. The remainder of the list have remained steady at prices from one to three points off last week's quotations: Alpha, at 20c.; Alta, 25c.; Bullion, 90c.; Challenge, 40c.; Crown Point, 90c.; Confidence, \$1.70, a decline of 65c. on the week's trading; Justice, 30c.; Lady Washington, 10c.; Occidental 40c.; Overman, 50c., and Yellow Jacket, 55c.

Light sales have been made in outside stocks, Bodie selling for 20c.; Bulwer for 15c., and Mono for 15c.

In the Quijota group Peer has sold in very small lots for 5c. and Peerless for the same figure. Silver King was held for 40c.

The Tuscaroras are conspicuous by their absence on the list, the quotations being as follows: Belle Isle, 15c.; Del Monte, 5c.; Grand Prize, 10c.; North Bell Isle, 15c.; North Commonwealth, 5c.; and Nevada Queen, 10c., all asked.

The market at the close was rather stronger than throughout the day.

SAN FRANCISCO, Dec. 23. (By telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$1.15; Bodie, 15c.; Bulwer, 15c.; Chollar, 55c.; Consolidated California & Virginia, \$1.50; Eureka Consolidated, \$1.50; Gould & Curry, 75c.; Hale & Norcross, 65c.; Mexican, \$1.15; Mono, 15c.; North Belle Isle, 15c.; Navajo, 15c.; Ophir, \$1.50; Savage, 85c.; Sierra Nevada, \$1.20; Union Consolidated, \$1.10; Yellow Jacket, 40c.

**MEETINGS.**

American Coal Company, at the office of the company, in New York City, December 29th, at 12 o'clock noon.

Hardinge Smelting Company, at the office of the company, in Aspen, Colo., January 10th, at 12 o'clock noon.

**DIVIDENDS.**

Daly Mining Company, dividend No. 70 of 25 cents per share, \$37,500, payable December 31st, at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York City.

Maryland Coal Company, dividend of 1¼%, \$52,500, payable January 4th, 1893, at the office of the company in New York City. Transfer books close December 24th and reopen January 5th, 1893.

Mollie Gibson Consolidated Mining and Milling Company, dividend No. 30 of 15 cents per share, \$150,000, payable January 15th, 1893, at the office of the company in Colorado Springs, Colo. Transfer books close January 8th and reopen January 16th.

North Star Mining Company, dividend No. 7 of 50 cents per share, \$50,000, payable December 28th, at the office of the company, No. 18 Wall street, New York City. Transfer books close December 20th, and reopen December 29th.

**ASSESSMENTS.**

COMPANY.	No.	When levied.	D't'nt' in office.	Day of sale.	Amt per share.
Belle Isle, Nev.....	16	Nov. 5	Dec. 12	Jan. 4	.10
Carra, Cal.....	.....	.....	Nov 23	Dec. 28	1.60
California, Cal.....	6	Sept. 28	Dec. 20	Jan. 7	.01
Challenge, Nev.....	13	Nov. 16	Dec. 31	Jan. 25	.25
Commonwealth, Nev.....	10	Nov. 23	Dec. 28	Jan. 24	.10
Con. Cal. & Va., Nev.....	.....	.....	Dec. 13	Jan. 21	.50
Con. Imperial, Nev.....	34	Nov. 22	Dec. 29	Jan. 19	.03
Con. New York, Nev.....	9	Nov. 2	Dec. 5	Dec. 28	.10
Del Monte, Nev.....	7	.....	Dec. 23	Jan. 21	.10
E. Best & Bel., Nev.....	3	.....	Dec. 24	Jan. 18	.20
Eclipse, S. Dak.....	7	Nov. 18	Jan. 3	Jan. 23	.001½
El Leopoldo, Mex.....	1	Nov. 11	Dec. 14	Jan. 2	.10
Evening Star, Nev.....	7	.....	Jan. 12	Jan. 31	.01
Gould & Curry, Nev.....	70	Nov. 22	Dec. 28	Jan. 20	.25
Indian Creek, Cal.....	3	Nov. 4	Dec. 14	Jan. 6	.10
Louvre, Con.....	1	.....	Dec. 14	Dec. 30	.05
Martin White, Nev.....	28	.....	Jan. 16	Feb. 20	.25
Navajo, Nev.....	23	Nov. 5	Dec. 9	Dec. 30	.10
North Gould & Curry, Nev.....	14	Nov. 21	Dec. 24	Jan. 16	.10
North Belle L., Nev.....	21	Nov. 14	Dec. 20	Jan. 17	.01
Russell, Cal.....	8	Nov. 14	Dec. 19	Jan. 16	.01
Sierra Nevada, Nev.....	103	Nov. 9	Dec. 14	Jan. 3	.25
Silver Lick Con., Nev.....	23	Nov. 5	Dec. 9	Dec. 30	.10
South Eureka, Cal.....	1	Nov. 2	Dec. 9	Dec. 31	.02
Trent, S. Dak.....	4	Oct. 29	Dec. 15	Jan. 5	.001
Yellow Jacket, Nev.....	53	.....	Jan. 6	Feb. 14	.30

**METAL MARKET.**

NEW YORK, Friday Evening, Dec. 23, 1892.  
Prices of Silver per Ounce Troy.

Dec.	Sterling Exchange.	London Pence.	N. Y. Cents.	Value of sil. in \$1.	Dec.	Sterling Exchange.	London Pence.	N. Y. Cents.	Value of sil. in \$1.
17	4 87½	38 ½	83¾	.635	21	4 87½	37 ½	82¼	.626
19	4 87	38 ½	83¾	.634	22	4 87½	38 ½	82½	.628
20	4 87½	37 ½	82¼	.626	23	4 87¾	38	82	.624

With the Government out of the market and London a very cautious buyer, silver has been tending down a point, where it is likely production will be curtailed.

There were sold during the week ending December 22d 95,000 ounces in silver bullion certificates at from 82¼ to 83¾ cents per fine ounce.

The United States Assay Office at New York reports the total receipts of silver for the week to be 163,000 ounces.

**Gold and Silver Exports and Imports at New York for Week Ending December 17th, 1892, and for Years from January 1st, 1892, 1891.**

	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
Week...	\$4,290,146	\$6,462	\$468,250	\$131	\$4,747,785
1892.....	66,286,696	8,452,227	22,167,302	2,970,671	75,580,850
1891.....	76,001,386	31,129,670	19,741,289	2,691,621	61,921,384

The exports and imports during the week ending December 24th, so far as ascertained, have been as follows: Exports, gold, \$4,425,800; silver, \$163,795. Imports, gold, \$35,010; silver, \$37,603. Of the gold exported \$3,900,000 went to Bremen, presumably for Austria.

There is little probability of gold going forward by the S. S. "Havel," which sails early on Tuesday next. As the sub treasury is closed on Monday, December 26th, it would be necessary to withdraw the gold either on Friday or Saturday morning. We learn that the insurance companies object to underwrite the risk for three days, while the gold necessarily would have to be on board the steamer lying at the dock. In addition to this the bankers would lose three days' interest, more than enough to extinguish the profit.

There has been a net loss of gold by the Treasury Department within the past 10 days of \$6,120,977, making the total net gold and bullion in the Treasury \$119,284,194. The lowest point reached by the Treasury in gold holdings this year was on July 30th, when it had fallen to \$110,444,000.

The stock of precious metals held in this country on December 1st was according to official report: Gold coin, \$577,983,121; gold bullion, \$73,126,222, a total of \$656,109,343. Silver coin, \$494,598,153; silver bullion, \$80,372,154, a total of \$583,970,307.

**NOTES OF THE WEEK.**

The International Monetary Conference has adjourned without accomplishing international bimetalism or reaching any definite conclusion in any direction. Among the measures proposed, that of Mr. Rothschild received, perhaps, the greatest attention; but of it "Money" says, "Mr. Alfred de Rothschild's scheme, which has been the subject of so much ignorant abuse, and of so much equally ignorant adulation, was, to our thinking, a perfect reductio ad absurdum of bimetalism, and of the several heresies allied to it. Put briefly, that scheme amounted to a proposal that the United States should be bribed to maintain their monthly purchases of the white metal for a further period of five years by an undertaking on the part of the great European Powers to buy collectively rather more than half as much per annum. The purchases were to be made at a fixed price of 43d. per ounce, or quite 10% above the present market value of the metal, and Europe was to encourage America in continuing a policy of stupendous folly by embarking on the same unknown sea of empiricism and experiment. A remedy so heroic—perhaps we should rather say so mock-heroic—would never have been seriously suggested, even at an International Conference, had not the dangers of the financial situation been both grave and imminent. It is probably no exaggeration to say that we are on the brink of a monetary crisis which must necessarily influence in no small degree the future of the world's commerce, and affect for better or for worse the destinies of millions. The collapse of the silver market is now certain.

That the complete demoralisation of the silver market must involve grave evils for India is a proposition that we do not care to dispute. These evils are for the most part directly attributable to the fact that India has borrowed heavily in gold. But whatever the genesis of the trouble, it is sufficiently apparent that a further heavy fall in the value of the rupee must seriously embarrass Indian finances. We take it that in this fact would lie the justification—if such there were—for Mr. Alfred de Rothschild's plan. He would bolster up the price of silver artificially for another five years, in order that countries circumstanced like India might have "time to turn round"—a breathing space in which to take stock of their liabilities and to devise means of



ful if any will be placed this month. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$2@2.20; tees, \$2.35@2.45; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.35@2.50.

**Plates.**—There is a weakening tendency noted among manufacturers' agents for mill lots of material. Warehouse trade is good. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.05@2.15; shell iron or steel, \$2.50@2.75; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, all sizes 65% and firm.

**Merchant Steel.**—Inquiry for several large amounts of specialties are in the market for wagon wagon makers, but generally trade is quiet. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.00@2.10; toe calk, \$2.30@2.40; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.70@1.75; open hearth machinery, \$2.30@2.40; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

**Galvanized Sheet Iron.**—Manufacturers' agents report a fair demand from warehouse from consumers, and discounts are unchanged at 70% and 10% off on Juniata and 70@15% and off on charcoal, and jobbing quantities at 70@5% off on the former and 70% and 10% off on the latter.

**Black Sheet Iron.**—Demand is well maintained and some large contracts are in the market for early shipments in January. We continue to quote iron sheets at 2.85c. for No. 27, common; steel sheets are 3c. Jobbers quote 3@3.10c. for iron and 3.10@3.15c. for steel, same gauge.

**Bar Iron.**—There is a distinct weakness on the part of some mills to shade prices on round lots of 300 to 500 tons of car iron, but large mills with established reputations for their product decline to meet the low prices which have been made, 1.60c. flat. Regular quotations are 1.62 1/2c. half extras, Chicago delivery or equal. Jobbers quote 1.75@1.85c. and 1.90c. for steel bars of ordinary make.

**Nails.**—Local nails are having a seasonable demand and some inquiry for early delivery of steel cut nails at \$1.62 1/2, 30c. average. Jobbers quote \$1.65@1.70 from stock. Wire nails, though not active, are in satisfactory demand in mill lots, but prices rule low at \$1.60 Chicago. Jobbing rates are \$1.70 in less than car loads.

**Steel Rails.**—The steel mills here have so far been kept fairly busy on small orders for prompt or very near by delivery, but they look for no big inquiry until after the turn of the year. Quotations are steady at \$31 and upward. Track repair materials are in light demand and prices unchanged at 1.70c. for iron or steel splice bars; spikes, \$2.05@2.15 for 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

**Scrap.**—An improved inquiry is noted from mills in this vicinity for early delivery next year, but prices are low and margins small. Quotations are: No. 1 railroad, \$15.50; No. 1 forge, \$15.00; No. 1 mill, \$9.50; fish plates, \$16.50; axles, \$19; horseshoes, \$16; pipes and flues, \$7; cast borings, \$6; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10.50; coil steel \$15; leaf steel, \$15.50; tires, \$14.50.

**Old Material.**—Several sales of iron rails have been made at a northwestern points at equal to \$19 Chicago. No demand here at \$18.75. Steel rails are very quiet at \$12.50@14.50 as to length, etc.; car wheels a drug at \$14.50@14.75.

**Louisville.** Dec. 17.

(Special Report by Hall Bros. & Co.)

There has been but very little change in the market since last reported. While the consuming trade appear to be actively employed on contracts, most of them have their iron brought for some time ahead and are content with the present and appear indifferent about any change that might occur in prices in the near future. Stocks were further reduced last month, which was an encouraging feature, but some of the smaller companies have displayed some anxiety for orders and some shaded prices have been reported. The larger companies, however, are more hopeful and are rather firm in their views.

**Hot Blast Foundry Irons.**—Southern coke No. 1, \$13.50@13.75; Southern coke No. 2, \$12.50@12.75; Southern coke No. 3, \$12@12.25; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16.

**Forge Irons.**—Neutral coke, \$11.50@12.00; mot tled, \$11@11.25.

**Car Wheel and Malleable Irons.**—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

**Philadelphia.** Dec. 22.

(From our Special Correspondent.)

**Pig Iron.**—The market is somewhat weaker, under a little anxiety upon the part of makers and brokers to dispose of stocks. The shadings amount to about 25c. per ton, and manifest themselves chiefly in forge irons. Several lots of standard Pennsylvania forge were offered as low as \$13.25, and poorer stock at \$13. The pressure to realize, if it continues, will probably establish a permanently lower rate. Makers think, however, that after the holidays there will be a general expansion of demand, and that prices will be restored. Foundry stocks are

quite low. This is the most favorable feature in the situation. Very little Bessemer is selling; quotations, \$16.

**Steel Billets.**—A large amount of business could be done, so manufacturers say, if they accepted offers made, which are said to be quite numerous; but however that is, there is very little actual business done. Quotations range from as low as \$24, it is said, to \$25, for Schuylkill Valley. A few small lots have sold.

**Muck Bars.**—The demand for soft steel has checked demand for muck bars, and offers were made yesterday, of guaranteed quality, at \$24.

**Merchant Iron.**—Country mills are soliciting business for January and February at 1.60, guaranteeing product. There is anxiety among mill men throughout this section to secure orders, and buyers show utter indifference, owing to the large capacity and the weakening tendency apparent in the market.

**Nails.**—Only a moderate demands exists for nails and holders are actively canvassing the market.

**Sheet Iron.**—A falling off in business is noted, both at stores and mills. Card rates are firm, especially for soft steel sheets. There is said to be a good deal of inquiry for galvanized, but no large sales.

**Skelp.**—Several small orders have been booked for skelp at 1.65.

**Wrought Iron Pipe.**—The wrought iron pipe manufacturers say there is a good demand for small lots; and excellent prospects for a heavier demand at an early date.

**Plate and Tank.**—Specifications are daily awaited for large lots of plate, flange and fire-box, but it is probable that no very large orders will be placed until the early part of January. The present business is made up of small orders at about 1.80 for tank, to 2.40 for steel flange.

**Structural Material.**—Specifications for large lots of bridge work are now in hand, and quotations will be made at a very early day. Beams, tees and channels have been quoted as low as 2c., and it is intimated something less. Angles, 1.85.

**Steel Rails.**—Representatives of the rail interests decline to say what was done at the last meeting, but intimate that there will be heavy orders placed before long, especially at Western mills.

**Old Rails.**—Old iron rails are quite plenty at \$18, and steel at \$15.

**Scrap.**—There is plenty of No 1 scrap offered at \$16.50, but few takers.

**Pittsburg.** Dec. 22.

(From our Special Correspondent.)

**Raw Iron and Steel.**—In anticipation of the holiday shut-down by the mills, orders for raw iron are coming in slowly and generally for limited amounts. There is no question of price involved, but consumers who do not want material are not tempted to buy by the assurance that prices will certainly be advanced in January. Upon this point there is certainly a wide difference of opinion, in view of the steady increase of production reported; still at the same time, both sides are well prepared with arguments that each one has the right side of the question.

Unless all signs fail the year 1893 will be a great year for the iron industries of the whole country. A well-informed Eastern dealer has this to say: "For the present, business is limited to the actual immediate needs of purchasers, and no change is looked for until after the holidays. To a much greater extent than usual the placing of contracts during the present month, to run during the coming year, has been postponed until after the close of this year, and everywhere is manifested a disposition to take no risks in the future, but to await further developments.

So far as the statistical situation is concerned the increasing consumption argues strongly for higher prices for pig iron, but the course of the market does not fully sustain the theory." Notwithstanding the increased output the consumption has been sufficiently active to absorb the production for the month, and in addition reduce the accumulated stocks at the furnaces over 64,000 tons.

Under present conditions, with business restricted to actual necessities, prices have not much significance, although producers are firm in their views, and insist on full quoted rates. Two very important features must not be overlooked, however. One is the vast increase of productive capacity, the other the marvelous progress that has been made in cheapening cost and the substitution of steel in the place of iron. An illustration: take skelp iron, for instance, last week. We reported sales of 750 tons wide grooved, \$1.57 1/2 per 100 lbs. and 650 tons wide grooved steel skelp, \$1.47 1/2, a difference of 10 cents.

Complaints of dullness and low prices and all that sort of a thing are therefore only relative terms, although so far as the manufacture is concerned it is or will be the "survival of the fittest." It should also be noted that this large increase in production has brought with it very little increase in the actual number of hands employed, but the advance in cheapness, although not noticed, is nevertheless common to all. Houses cost less to build and furnish, cars and railways and traveling facilities are increased and cheapened and the one thousand and one things that are all used are more easily within reach.

We get more for our money and although labor in its various fields is still the "under dog," a fair consideration of the question will show that on the average it gets its fair proportion, but labor like capital must adjust itself to new conditions. Puddlers, for instance, cannot resist the onward march of steel; there was a time, not many years ago either, when the entire finished iron trade was compelled to pay tribute to the puddlers. They got big wages, and deserved all they got, but things are different now. The work is just as laborious, but it is no longer indispensable and whether puddlers work or not makes comparatively little difference.

Prices for leading descriptions was fairly maintained, the indications are that no changes will occur during the balance of the year. The sales below will show the situation:

**Coke Smelted Lake and Native Ores.**

5,000 Tons Bessemer, Jan., Feb., March	\$13.85 cash.
4,000 Tons Bessemer, same delivery	13.75 cash.
3,000 Tons Bessemer, Jan., Feb., March	13.90 cash.
1,000 Tons Grey Forge	12.50 cash.
1,000 Tons Standard Grey Forge	12.60 cash.
500 Tons Grey Forge	12.50 cash.
500 Tons Bessemer	13.75 cash.
500 Tons Grey Forge	12.50 cash.
500 Tons Standard Grey Forge	12.60 cash.
300 Tons No. 2 Foundry, all ore	11.50 cash.
300 Tons No. 1 Foundry, all ore	15.00 cash.
300 Tons No. 1 Foundry	11.25 cash.
200 Tons No. 2 Foundry	13.25 cash.
150 Tons No. 1 Silvery	16.75 cash.
100 Tons No. 2 Silvery	13.25 cash.

**Charcoal.**

150 Tons Cold Blast	26.00 cash.
100 Tons Cold Blast	26.50 cash.
75 Tons No. 2 Foundry	19.00 cash.
50 Tons No. 2 Foundry	18.90 cash.
25 Tons Cold Blast, Extra	30.00 cash.

**Steel Blooms, Billets and Slabs.**

4,000 Tons Billets, first three months 1893 at Mill	22.00 cash.
1,500 Tons Billets, Jan., Feb., March	22.25 cash.
1,000 Tons Billets, Jan., Feb.	23.00 cash.
500 Tons Billets, Jan.	22.50 cash.
500 Tons Billets and Slabs, Jan., Feb., Delivered	23.50 cash.

**Muck Bar.**

800 Tons Neutral, Jan., Feb.	24.65 cash.
500 Tons Neutral, Jan.	24.70 cash.
400 Tons Neutral, Jan., Feb.	24.65 cash.

**Ferro-manganese.**

100 Tons Foreign, 80% delivered	69.00 cash.
100 Domestic, 80%	62.00 cash.

**Blooms and Billet Ends.**

500 Tons Bloom Ends	16.00 cash.
300 Tons Bloom and Billet Ends	16.00 cash.

**Skelp Iron.**

400 Tons Sheared Iron	1.77 1/2 4 m.
300 Tons Narrow Grooved	1.57 1/2 4 m.
20 Tons Wide Grooved	1.57 1/2 4 m.

**Skelp Steel.**

350 Tons Wide Grooved	1.42 1/2 4 m.
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**Sheet Bars.**

325 Tons Sheet Bars, at mill	28.50 cash.
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**Steel Wire Rods.**

400 Tons Five-Gauge American, at mill, spot	30.80 cash.
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**Old Iron and Steel Rails.**

500 Tons Old Steel Rails, Mixed lengths	15.25 cash.
400 Tons	15.25 cash.
400 Tons American T's	20.50 cash.

**Scrap Material.**

400 Tons Cart Scrap, gross	11.75 cash.
200 Tons No. 1 R. W. Scrap, net	16.00 cash.
150 Tons Crucible Steel, net	29.00 cash.
100 Tons Cast Borings, gross	8.00 cash.

**COAL TRADE REVIEW.**

**NEW YORK, Friday Evening, Dec. 23.**  
Statement of shipments of anthracite coal (approximated) for the week ending December 17th, 1892, compared with the corresponding period last year:

Regions	Dec. 17, 1892.	Dec. 19, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region	451,545	457,178	Dec. 5,633
Lehigh Region	144,574	127,095	Inc. 17,479
Schuylkill Region	273,476	262,441	Inc. 11,035
Total	872,595	846,714	Inc. 25,881
Total for year to date	40,320,177	39,251,884	Inc. 1,068,293

Statement of shipments of anthracite coal for month of November, 1892, compared with the corresponding period last year.

Compiled from the returns furnished by the mine operators.

Regions	November 1892.	November 1891.	Difference.
	Tons.	Tons.	
Wyoming Region	1,943,992.09	2,099,572.06	D. 155,579.17
Lehigh Region	613,613.08	585,936.02	I. 27,677.06
Schuylkill Region	1,212,104.15	1,442,043.15	D. 229,944.00
Total	3,769,710.12	4,127,557.03	D. 357,846.11

Regions	Year to date, 1892.	Year to date, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region	20,908,584.05	19,440,198.13	I. 1,468,385.12
Lehigh Region	5,397,305.09	5,870,443.16	I. 36,876.13
Schuylkill Region	11,551,349.10	11,619,717.09	I. 68,367.19
Total	38,297,238.04	36,960,364.18	I. 1,436,874.06

The stock of anthracite coal on hand at tide-water shipping points November 30th, 1892, was 732,453 tons; on October 31st, 1892, 680,563 tons; increase, 51,890 tons.

PRODUCTION OF BITUMINOUS COAL for week ending December 17th, and year from January 1st.

## EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.	2,039	92,822	154,866
Cumberland, Md.	72,762	3,696,003	4,017,275
Berkeley, Pa.	973	65,123	193,054
Broad Top, Pa.	17,288	675,914	504,991
Clearfield, Pa.	86,550	3,869,754	3,596,268
Allegheny, Pa.	27,703	1,240,186	1,192,381
Beach Creek, Pa.	34,072	2,155,200	2,314,814
Pocahontas Flat Top	68,424	2,577,227	2,231,286
Kanawha, W. Va.	68,706	2,614,503	2,344,430
Total	380,247	16,936,719	16,849,365

\*Week ending November 30th.

## WESTERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.	24,794	1,225,379	1,222,989
Westmoreland, Pa.	48,778	1,730,162	1,884,287
Monongahela, Pa.	17,672	647,131	58,902
Total	91,244	3,602,672	3,690,178

Grand total 471,491 20,539,391 21,539,483

PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending December 17th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 117,997 tons; year 5,224,701 tons; to corresponding date in 1891, 4,316,981 tons.

## Anthracite.

The trade is pursuing the usual route at this time of the year. There is nothing of special importance to record concerning the progress of the congressional inquiry into the combine, nor of any other feature of more than passing interest. Public interest, which seemed to be on the eve of gratification, is again obliged to bide its time in patience. One of the most successful of all attempts to unify miners, shippers and sales agents draws toward the close of the year with the consumers still in ignorance of their rights in the matter. It is all very well to talk about the harmonious co-operation of erstwhile conflicting forces, the unification of interests, the symmetrical blending of incongruous elements, or any other plausible phrase concealing the true condition of a great industry. But the unification that leaves the consumer on the outside, that raises the price of a widely used and most necessary article of common life beyond a fair profit is a thing we can very well afford to be without.

The course of the Congressional inquiry up to this time has been marked by a lack of definite knowledge of what was needed. It seemed to undertake the task of public enlightenment without knowing whether the public were suffering from a merely temporary obscuration of vision, due possibly to a black eye, or whether there was a cataract in process of formation, or whether paralysis of the optic nerves threatened to destroy the vision entirely.

The committee did not know what was the specific trouble, nor how to ascertain what it was, nor what the remedy was, nor how to apply it. The question that most concerns the public is not whether the sales agents fixed the prices, after consultation with the coal companies or before, not whether the agents were acting under specific or general instructions, written or tacit; not whether the prices were fixed by this means or that, but solely, "Are the present prices in excess of a fair profit?"

If they are then they are amenable to the statute law as distinct from the law of supply and demand, and come at once within the scope of the Inter-State Commerce Commission. If they are not, then Congress has nothing to do with the matter, and its attempts to inquire into private business should be frustrated.

It is not too late now to remedy the serious mistake into which the committee was led by undue zeal. It seems to us that it began its investigations on the assumption that the combine was iniquitous in conception, illegal in operation and oppressive in practice. It seems not to have paused to consider whether or no the increase in prices was not in a measure warranted by the existing conditions of the trade.

We do not say that this was the case; indeed the drift of such evidence as is to hand is against such a supposition, but we do say that an investigation of this sort cannot be conducted in too careful a manner. When the committee resume their labors it is to be hoped that they will confine themselves to the question as to whether, under the circumstances, the advance in price was or was not justifiable and to determining whether a freight rate of one-half cent per ton mile, which the roads are glad to get on bituminous coal and which it is believed they allow in some roundabout way to certain shippers of anthracite is a fair one for all. If it is, then, the price of anthracite should be in accordance therewith. The legal questions are subordinate to this, not in the sense of being really less important but in that of being less pressing.

## Bituminous.

The bituminous coal trade is suffering from a scarcity of cars. This is an old complaint, which, indeed, has almost become chronic. Explanations are in order but are not to be obtained. A curious fact in this connection is that mining companies owning their coal cars are in no better condition than those that depend on the grace of the railroads.

There is a company that owns 1,000 cars of a total capacity of 30,000 tons per day, and yet is unable to load a vessel with 600 tons in less than six days. It is difficult to induce a skipper to stay for coal under such conditions. This same company could easily supply 2,000 tons per day to vessels in the coastwise trade, but is so hampered by lack of cars as to be forced to curtail orders.

Something is radically wrong with the transportation department of some of the principal railroads, for it is evident that they are unable to handle the coal traffic. Whether it be from lack of terminal facilities, lack of engines, lack of cars or lack of good will, the fact remains that the trade is at a serious disadvantage.

The bituminous coal trade is in the hands of aggressive men, they mean to push it to the farthest possible limit and to capture every available market. But they can do nothing without the hearty co-operation of the transportation companies, and it is to these that everyone turns for relief. The extension of trade depends upon the extension of transportation facilities, and if these be lacking there can be no new avenues nor a proper condition of the old.

There has been an advance in rates. Philadelphia to Boston, 90c., and to Sound ports, 80c@85c. From Baltimore to Boston and Sound ports the rates are 10 cents higher than from Philadelphia.

## Boston.

Dec. 22.

(From our Special Correspondent)

The anthracite coal market here is very quiet. As the yards are fairly well stocked and trade is light, they really have no occasion to purchase just now. Stock-taking season is now upon us, which is another hindrance to trade. Business is so very quiet here that cutting is more rampant than it has been for months. The Reading and allied companies are holding up well to circular prices. The cutters are the smaller outside companies. Concessions of 30c. per ton are being made by the latter. Even at these concessions very few people are induced to purchase. Soft coal on cars here is firmer than it has been for some time. Deliveries are slow as yet and freight rates are higher. On cars here George's Creek coal is worth from \$3.60@3.65 per ton, and Clearfield from \$3.35@3.45 per ton.

With the exception of New York rates, freights have advanced about 5c. per ton all around. The low offerings of barges from New York keeps rates down from that port.

Rates are from New York to Boston 50c., from Philadelphia 90., to Bath \$1.00, to Providence 75c., from Baltimore \$1.60, from Newport News 85c.@90c., to Sound Points 80c@85c.

The retail prices here are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.25.

The receipts of coal at this port for the week ending December 17th were 42,623 tons of anthracite and 7,960 tons of bituminous, against 42,421 tons of anthracite and 7,803 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 2,004,992 tons of anthracite and 833,149 tons of bituminous, against 2,012,723 tons of anthracite and 953,356 tons of bituminous for the same time last year.

## Buffalo.

Dec. 22.

(From our Special Correspondent.)

Anthracite coal quiet and unchanged in price. Bituminous coal in good demand from manufacturers and quotations strong but without variations; supply adequate to all trade requirements. Dealers anticipate a good winter's business as all branches are in full work with orders in hand, and several large establishments will be ready to commence operations in the city and just outside the limits before many weeks pass by. It is expected that employment will be found for over 20,000 workmen before midsummer in addition to the present large army of artisans.

The Buffalo Electric Power Company has lately signed a contract with the (Canada) Cataract Construction Company for 10,000 H. P., which power will be assured in about three months.

The car-building establishments in this city are working to full capacity, turning out new and repairing old freight and other cars and gondolas.

The Reading Railroad system intends increasing its coal shipping and receiving facilities at the Tift farm and at the foot of Georgia street in this city, as the present trestles, etc., have been found to be not sufficient to meet the company's needs.

It is reported that the Northern Central Railroad is having a preliminary survey made of a new line from Canandaigua to Buffalo. Its effect would be to get the Pennsylvania system into our city and give it a chance for the coal trade of Western New York, etc. Total coal tonnage passing through the Sault Ste. Marie Canal during the season of navigation of 1892, was 2,904,266 net tons, as compared with 2,507,532 net tons in 1891; an increase this year of 396,734 net tons over 1891, or 26 per cent.

## Chicago.

Dec. 22.

(From our Special Correspondent.)

There is no change in the situation here, dealers still continuing the hand to mouth policy which has characterized the anthracite trade since the season commenced. One shipper who was very much dissatisfied with the reports from his traveling salesman, made a trip himself through the Western country and returned this week thoroughly satisfied with the reports of his men that the country dealers were only buying as their necessities required. When

asked why they did not stock up a little, they invariably replied, why should we, when we can get supplies as we need them, why should we take any risk of a decline? All rail coal is abundant and the market, not only here, but at other Western shipping points, overstocked.

Docks are crowded and in all likelihood will remain so unless the present cold weather continues. If it does there may be as lively a scramble for hard coal as there is for soft coal now down in Western Kansas. The retail trade is in fair shape, but orders are small and with even some of the larger dealers; 60 to 100 tons a day is considered a good day's trade. As we have previously stated in these reports prices are indirectly shaded according to circumstances.

Bituminous coal is in good demand. The scarcity of cars, and the attempts to get stock ahead before and for the holidays, has kept all the miners and railroads busy. We hear of sales of the better grades of Indiana bituminous as high as \$2.60 per ton on track at Chicago, in large quantities; also the sales of Taylorville and Springfield, Ill., coal at \$2 on track here, in round lots. These prices are from 25c. to 40c. per ton over the usual rates for these coals, and more clearly indicate the situation than any long-winded dissertation on the part of the writer. Indiana block coal continues scarce and very uncertain in supply. There are large amounts of Hocking en route to Chicago to fill contracts which may be largely interfered with by the annual "celebrations" of the miners and the irregular work at the holiday season consequent thereon. A few more mild days and the shippers will have their back orders all out of the way and will then be ready for new business. It is said, and is generally believed, that the new combination in the Hocking, O., region starts out with better prospects of success than any of its predecessors. The limitation of production will settle the question of value more satisfactorily to the shippers than any attempt to directly control the price would result in.

Coke is in moderate demand for foundry purposes, and shippers of best Connellsville or the cheaper West Virginia grades look for no improvement until after the turn of the year. Crushed domestic of Connellsville make is making fair progress and the introducers are satisfied.

Quotations are: \$1.65 furnace; \$5.05 foundry, crushed, \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.60@2.75.

## Pittsburg.

Dec. 22.

(From our Special Correspondent.)

Coal.—The liberal receipts of both Kanawha coal at Cincinnati have earned as expected quite a break in the price of coal in that market. It is very certain that there has been no bonanza in the coal business of late. There is not a more disgusted lot of men in business in this section of the country than the river coal operators, because of their inability to get ever cost price for their coal in Cincinnati and Louisville markets, not that they are anxious to sell at cost, but that is the figure which is being offered without markets for Pittsburg coal. This is a condition which is almost unparalleled in the business, but it is simple of explanation. It has been generally the case in the past that a lengthened dry spell on the river had the effect of clearing the lower markets of Pittsburg coal; coal held in these markets during that period realized improved prices, and finally, when the new season's run was made the drop was not below a point that left a fair margin of profit to the owner. A change, however, has come over the sweet spirit of the lower markets coal trade during the past 12 months. The Kentucky and Illinois railroad men, aided by cheap lands and cheap mining prices been pushed into the market and joined issue with the river men for the trade. The Kanawha operators, similarly well circumstanced, have also had a say in the matter and have nobly aided their railroad neighbors in squealing the Pittsburg operators. Paying 3¢c. for mining is out of the question; there are a number of men at work at 3 cents, others are ready to go in when wanted.

Connellsville Coke.—Owing to a better supply of cars the shipments show an increase. The estimated production reached 123,512 tons, about two per cent. increase over the previous week's production. The active ovens averaged 5-17 days as against 5-07 days the week previous. The Frick Company increased its average from 4-65 days to 4-72 days. At the Rainey plant 21 ovens were blown in. At the Grace mine 75 were blown out. At the Lippincott works 100 ovens were blown out and 40 ovens blown in at Hecla No. 2, and 40 at the Atlas mines. Week's shipments from the region aggregated 137,146 tons, distributed as follows: To Pittsburg, 1,875 cars; points east of Pittsburg, 1,643; points west of Pittsburg, 3,700 cars; total, 7,218 cars. Western shipments increased 68 cars, Eastern shipments 203 cars, while Pittsburg shipments fell off 176 cars, due to blowing out furnaces.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec 23, 1892.

Acids.—A good business is doing in acid. Manufacturers report that the demand keeps up and that acid is being sold every day, both for immediate and for future delivery. There is no change to report in prices, which continue as follows: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2, according to quality; muriatic, 18", 90c.@\$1.10; 20", \$1.10@1.25; 22", \$1.25@1.50; nitric, 40", \$4; 42", \$4.50@5.75; sulphuric, 90c.@\$1.10; mixed acids, according to mixture; oxalic, \$6.50@7.25. Blue vitriol is quoted all the way from \$3.25@3.75; glycerine for nitro glycerine, 11 1/2@12 1/2c., according to quality and quantity.

Brimstone.—The brimstone market is somewhat firmer than at the time of our last report, and prices show a slight advance. Consumers are keeping away from the market just now, and not much business was done during the week. Our quotations are as follows: Best unmined seconds, on the spot, \$26; ex-steamer now due, \$24; ex-steamer due in 10 days, \$23, future shipments, \$21. For thirds the price is \$1 less. Mr. Alfred S. Malcomson has published the following statistics:

Table with 4 columns: Month, To all countries, United States included, To all ports in United States. Rows include January through November and December estimated.

Estimated increase of exports to all countries, United States included, 13,745 tons. Estimated decrease of exports to the United States, 10,640 tons.

Heavy Chemicals.—There is absolutely nothing new to report in this market. The dullness continues unrelieved, as is usual at the close of the year. Caustic soda is very quiet, only a few small sales on the spot being reported. Alkali is firmer; arrivals

have been free, but the bulk was contracted for and hence not offered for sale. Sal soda is dull.

Our quotations to-day are as follows: Caustic soda 60%, 3-17 1/2@3-27 1/2c.; 70%, 2-95@3-12 1/2c.; 74%, 2-97 1/2@3-15c.; 76%, 3-12 1/2@3-25c.; 77%, 3-12 1/2@3-25c. Carbonated soda ash, 48%, 1-57 1/2@1-60c.; 58%, 1-47 1/2@1-52 1/2c. Alkali, 48%, 1-50@1-55c.; 58%, 1-37 1/2@1-42 1/2c. Sal soda, English, on the spot, 97 1/2@1c.; American, 90@95c.; bleaching powder, 2-30@2-50c.

Fertilizing Chemicals.—There is no change to report in the general condition of this market. The demand is good, especially from the South, and prices, where they have not advanced are firm. Our quotations this week are as follows: Sulphate of ammonia, \$2.90@2.95 for bone goods and \$2.95@3 for gas liquor. Dried blood, \$2.50 per unit for high grade and \$2.35 for low grade; acidulated fish scrap, no stocks on hand; dried scrap, \$26.50@27; Azotine, \$2.45@2.50. Tankage, high grade, \$25@26; low grade, \$22@24, according to grade. Bone tankage, \$22.50@23.50; bone meal, \$24.50@25.50.

Double manure salts are unchanged. The price has been fixed by the syndicate's agents, and has not changed during the year. Quotations are as follows: \$1.13 1/2 cwt., basis 48@50%, in 50 ton lots, on foreign weights and analysis. High grade sulphate, \$2.13 cwt. basis 90%, foreign weights and tests.

Phosphates.—Phosphate rock, Florida, 60@70%, is quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.50@5 f. o. b., Charleston. Mr. Paul C. Trenholm, the well known phosphate broker, of Charleston, S. C., sends us the following interesting statistics showing the shipments of phosphate rock from that port during November 1890, 1891 and 1892. To domestic ports: In 1890, 23,205 tons of crude rock; in 1891, 21,933 tons; in 1892, 15,049 tons of crude and 529 1/2 tons of ground rock. To foreign ports: In 1890, nil; in 1891, 189 tons of crude rock; in 1892, nil.

Kainit.—Arrivals during the week amount to 800 tons. Prices continue as follows: \$3.75 for invoice weight and \$9 for actual weight, New York and Philadelphia; Southern ports \$1 higher.

Muriate of Potash.—Arrivals during the past week amounted to 2,300 tons the heaviest arrivals of any one week during the past year. This is due to the closing of river navigation on the other side, which has caused the shipments to be rushed from the mines to the sea. Prices are: For 50 tons or over, New York or Boston, \$1.81 1/2; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.86 1/2. Further shipments, owing to the increased cost of transportation, are 5c. higher. Next years' prices will be fixed next week.

Nitrate of Soda.—This market is easier. Prices for goods on the spot are \$2.15@2.20.

Liverpool.

Dec. 14.

(Special Correspondence of Joseph P. Brunner & Co.)

As regards orders for prompt delivery, our market for heavy chemicals is decidedly slow, but for next month and over 1893, there is a good inquiry.

Soda Ash is only obtainable in retail quantity for December and orders from America for early delivery have been returned unfilled. Spot quotations are quite nominal, as follows:

48% caustic ash, £5, 6s. 3d. per ton and upwards. 57-58% £6, 7s. 6d. per ton and upwards. 48% carbonated ash, £5, 7s. 6d. per ton and upwards. 58% £6, 10s. 0d. per ton and upwards, net cash. 58% ammonia ash, £6, 7s. 6d.

Soda crystals are not active, but quotations remain steady at £3, 3s. 9d@£3, 5s. per ton, less 50%.

Caustic Soda is still in light request and quotations vary considerably according to the export market. The nominal spot figures are: 60%, £9 2s. 6d. per ton; 40%, £10 5s. per ton; 74%, £11 5s. per ton 76%, £12 2s. 6d. per ton and upward net cash. For parcels under 10 tons 5s. per ton extra is charged. For certain markets a reduction is made on above prices, ranging from 10s. to 20s. per ton and a similar concession represents about nearest values for deliveries over 1893.

Bleaching Powder in moderate demand and steady at £1 15s. to £8 per ton net cash for hard wood packages, and same figures asked for contracts over next year.

Chlorate of Potash is inquired for but not much actual business to report, and prices a shade easier, at 8 1/2 d. for December, 7 1/2 d. to 8 d. for January, 7 1/2 d. for February-March and 7 d. for April-December, 1893.

Bicarb. Soda is unchanged at £6 15s. per ton, less 2 1/2% for one cwt. kegs, with the usual allowances for larger packages.

Sulphate of Ammonia is perhaps a shade weaker, being offered more freely, and we quote £10 6s. 3d. to £10 7s. 6d. per ton for 24% and £10 8s. 9d. to £10 10s. per ton for 25%, both in double bags, less 2 1/2% f.o.b. Liverpool.

Nitrate of Soda quiet but firm at £9 5s. to £9 7s. 6d. per ton, less 2 1/2% for double bags f.o.b. here.

Carbonate of Ammonia—Lump, 2 1/2 d. to 3d. per lb.; powdered, 3 1/2 d. to 3 3/4 d. per lb.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Table of current prices for various chemicals and minerals including Acid, Alcohol, Alum, Ammonia, Antimony, Argon, Arsenic, Asbestos, Ashes, Pearl, Asphaltum, Barium, Bromine, Cadmium, Calcium, Chalk, China Clay, Chlorine Water, Chrome Yellow, Chrome Iron Ore, Chromalum, Cobalt, Copper, Vitriol, Nitrate, Ferric Chloride, Fuller's Earth, Glauber's Salt, Glass, Gold, Iron, Kaolin, Kieselrite, Lead, Litharge, Magnesia, Manganese, Mercuric Chloride, Marble Dust, Metallic Paint, Mineral Wool, Mica, Naphtha, Nitrate, Nitric Acid, Ochre, Potash, Potassium, Phosphorus, Plumbago, Potassium Cyanide, Terra Alba, Tin, Vermilion, Zinc, and Zinc White.

Table of current prices for various chemicals and minerals including Bromine, Cadmium, Calcium, Chalk, China Clay, Chlorine Water, Chrome Yellow, Chrome Iron Ore, Chromalum, Cobalt, Copper, Vitriol, Nitrate, Ferric Chloride, Fuller's Earth, Glauber's Salt, Glass, Gold, Iron, Kaolin, Kieselrite, Lead, Litharge, Magnesia, Manganese, Mercuric Chloride, Marble Dust, Metallic Paint, Mineral Wool, Mica, Naphtha, Nitrate, Nitric Acid, Ochre, Potash, Potassium, Phosphorus, Plumbago, Potassium Cyanide, Terra Alba, Tin, Vermilion, Zinc, and Zinc White.

Table of current prices for various chemicals and minerals including Marble Dust, Metallic Paint, Mineral Wool, Mica, Naphtha, Nitrate, Nitric Acid, Ochre, Potash, Potassium, Phosphorus, Plumbago, Potassium Cyanide, Terra Alba, Tin, Vermilion, Zinc, and Zinc White.

Table of current prices for various chemicals and minerals including Terra Alba, Tin, Vermilion, Zinc, and Zinc White.

THE RARER METALS.

Table of current prices for various metals including Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Glucinum, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Osmium, Palladium, Platinum, Potassium, Rhodium, Ruthenium, Rubidium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Titanium, Thorium, Tungsten, Uranium, Vanadium, Yttrium, and Zirconium.

NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, Dividend dates (Dec. 17, 19, 20, 21, 22, 23), and Sales. Includes companies like Adams, Colo., Alice, Mont., and Alpha, Nev.

\*Ex-dividend. †Dealt in New York Stock Ex. ‡Unlisted securities. ††Assessment paid. †††Assessment unpaid. Dividend shares sold, 14,475. Non-dividend shares sold, 7,600. Total shares sold, 22,075.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Dividend dates (Dec. 16, 17, 19, 20, 21, 22), and Sales. Includes companies like Atlantic, Mich., Bodie, Cal., and Allouez, Mich.

Dividend shares sold, 6,913. Non-dividend shares sold, 2,669. Total shares sold, 9,573.

DIVIDEND-PAYING MINES

Table with columns for Name and Location of Company, Capital Stock, Shares, and Assessments. Includes companies like Adams, L. C., Alaska-Treadwell, g., and Argenta, s.

NON-DIVIDEND PAYING MINES.

Table with columns for Name and Location of Company, Capital Stock, Shares, and Assessments. Includes companies like Alliance, s. g., Allouez, c., and Alpha, c. g. s.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Name and Location of Company, Capital Stock, Shares, Assessments. Lists various mining companies and their financial details.

G. Gold. S. Silver. L. Lead. C. Copper. B. Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42, 90,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends against \$425,000 in assessments.

COAL, RAILWAY AND OTHER STOCKS.

Table with columns for Dec. 17, Dec. 19, Dec. 20, Dec. 21, Dec. 22, Dec. 23, and Sales. Rows list various stock names like Adams Express, Albany & Susq., etc.

COAL, RAILWAY AND OTHER STOCKS.

Table with columns for Dec. 17, Dec. 19, Dec. 20, Dec. 21, Dec. 22, Dec. 23, and Sales. Rows list various stock names like Ohio & Miss., Ohio Southern, etc.

Total shares sold, 2,114,582.

San Francisco, Cal.

Table with columns for Dec. 16, Dec. 19, Dec. 20, Dec. 21, Dec. 22. Rows list various stock names like Alpha, Alta, Belle Isle, etc.

St. Louis. Dec. 20.

Table with columns for Bid, Asked. Rows list various stock names like Adams, American & Nettie, etc.

Foreign Quotations.

Table with columns for Highest, Lowest. Rows list various foreign stock names like Alaska Treadwell, Amador, etc.

STOCK MARKET QUOTATIONS

Colorado Springs, Colo. Dec. 17

Table with columns for Bid, Asked. Rows list various stock names like Anaconda Gold, Argentum-Juniata, etc.

Pittsburg, Pa.

Table with columns for H, L. Rows list various stock names like Bridgewater Gas Co., Consolidated Gas Co., etc.

Paris. Dec. 8.

Table with columns for Francs. Rows list various foreign stock names like Belmez, Spain, East Oregon, etc.